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ABSTRACT

Research investigated the feasibility of a diagnostic media test system. Two distinct tests were developed for sixth grade and university populations, each having: 1) a main phase with three specific teaching sequences, one for each media form; 2) test items for each teaching sequence; and 3) a validation phase with one teaching sequence translated into each of the media forms and with questions corresponding to this sequence. Main phase test scores generated individual media effectiveness profiles; in retesting, each student took the validation test in the media form which his profile indicated as most effective. High positive correlations resulted. For university students, slides/tapes and tests were more effective than audio tapes, whereas for sixth graders programed instruction was best. The investigation showed the model was feasible and generalizable, that either the tests often did not discriminate well or that for many individuals there was little difference between the effectiveness of some media forms, and that teachers can produce media diagnostic tests. Further research was suggested for the affective and psychomotor domains, to determine if time and experience influence profile validity, and to see if practice or instruction affects individual profiles. (Author/PB)

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UNIVERSITY OF NORTHERN COLORADO
Greeley, Colorado
The Graduate School

THE FEASIBILITY OF A DIAGNOSTIC MEDIA TEST SYSTEM MODEL

A Dissertation Submitted in Partial Fulfillment
of the Requirement for the Degree of
Doctor of Education

Alfred V. Rapp

School of the Arts
Department of Industrial Arts

1972

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ABSTRACT

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Purpose of Study

The purpose of this study was to determine the feasibility of the diagnostic media test system. Specifically the study concerned itself with the ability of the system to: 1) produce learning style profiles in terms of ranked effectiveness of the media covered by a test; 2) function at different grade levels and with different media; 3) serve as a model, usable by classroom teachers, in constructing tests for specific learning environments.

Procedure

The data for this study were obtained by developing two separate and distinct tests for the populations used in the study. Each test contained: 1) a main phase having three specific teaching sequences, one for each of the media forms covered by the test; 2) a corresponding set of nine test items for each of the three teaching sequences; 3) a validation phase composed of one teaching sequence which was translated into each of the three media forms covered by the test and a set of nine test items which corresponded to this teaching sequence.

For test administration, the university student population was broken into three small groups, each group taking the test at a different time, while all the students of the sixth grade population were tested simultaneously. Individual media effectiveness profiles were generated from the test scores. In retesting, each student was given the validation phase test in the media form which his main profile indicated as being most effective for him. These validation tests were then scored in the same manner as the main phase test and the results were recorded.

A correlation was run between the students' highest scores on the main phase and their corresponding validation phase scores, thus permitting comparison of the tests and determination of the system's ability to function at different levels and with different media.

Findings

The correlation between the main phase of the test and the corresponding validation phase was +0.92 for the university students and +0.88 for the sixth grade students.

The distribution of most effective media among the university students showed slide/tape and text having a slightly higher concentration of students than the audio tape form. The distribution of most effective media was heavily concentrated in the programmed instruction media form with the sixth grade students.

In the total population of fifty-three students, twenty-one or approximately 40 percent had a difference of only one point or less between their highest score and their next highest score.

Through the utilization of basic media production equipment and techniques it was possible to produce all of the media necessary for the tests used in this study.

Conclusions

As a result of this study and the data obtained, the following conclusions were drawn:

1. The system is a feasible model capable of predicting individual learning style profiles in terms of the ranked effectiveness of the media covered by a test developed in accordance with the system.
2. This test system can be reapplied to construct new tests for other media forms and other academic levels which are equal (having met the minimum correlation requirement) in their effectiveness for providing individual student media learning style profiles.

3. Each teaching sequence remains equally valid as a diagnostic element regardless of its position in the administrative sequence.
4. Either the test used did not develop sufficient discrimination or, for many individuals there is very little difference between effectiveness of some media forms.
5. Teachers who have taken one or two basic media courses should have the background necessary to produce a media diagnostic test which utilizes basic media forms.

Recommendations for Further Study

The following are further avenues of investigation which have suggested themselves as a result of this study.

1. The system as proposed in this study should be retested for the psychomotor and affective domains in order to determine how the system functions in these areas.
2. It is recommended that additional experimentation be conducted in the pattern of this study to determine the effect of time and experience on the validity of an individual profile.
3. It is recommended that additional experimentation be conducted in the pattern of this study to find out what effect instruction and/or

practice in the use of a particular media form might have on the resultant profile of individual students.

ACKNOWLEDGEMENTS

The writer wishes to offer a special note of appreciation to his wife Carol, who listened, read, commented when necessary and who has been a number one helpmate; to his children, Carla Gene and Melissa, who left mommy alone long enough so that she could help daddy; and to his advisor, Dr. F. Morris Johnson, for his encouragement and sound guidance as well as the time and effort he expended.

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CHAPTER I

INTRODUCTION

The recognition of individual differences and their implications for the learning process is not a new concept. Specific references to the recognition of the individuality of the learner and the need to account for his individual differences can be found throughout the history of education. However, in the last decade there has been an intensification of effort to develop educational systems which recognize the individual differences of the learner and which further attempt to account for these differences through a variety of educational systems.

Exemplifying this intensification of efforts in the individualizing process is the work and resultant recommendations of the National Education Association's Project on Instruction, conducted in the early sixties.

This paragraph from Schools for the 60's, the report published on the Project on Instruction, summarizes one of several problems which education found itself facing at that time.

> Human variability is real, inevitable, ineradicable, desirable, and, indeed, essential. Some of this variability shows up in individual differences in ability and desire to learn and in ways of learning. The

> differences exist within individuals as well as among them, and they complicate the problem of school organization. They complicate it in part because the central problem in school organization is to promote the greatest possible individual growth and learning within a group setting.
>
> No scheme of school or curriculum organization washes away human variability or the manifold problems of dealing with it instructionally. This being so, much organizational effort clearly is misplaced. Organization cannot eliminate individuality--that is impossible and undesirable. But it can illuminate individuality so that human ingenuity will be more likely to come to terms with it.[1]

As the decade progressed, so did the understanding and implementation of the process of individualized instruction. This progress is reflected in the numerous projects and school systems which publicly professed belief in, and afforded efforts to implement systems of individualized instruction.

A refinement of the understanding of the individualizing process and a clearer specification of needs for the process are found in a speech by Aramintia V. Harris, delivered in April, 1969 at the National Society for Programmed Instruction Conference, in Washington, D. C. In the speech Harris says:

> A key aspect of individualized instruction is that each student should be permitted to work at the places in the learning sequence most appropriate for him with amounts and kinds of instruction adapted to his individual needs. Each child is unique. Not only does he

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[1] _Schools for the Sixties_ (New York: McGraw-Hill Book Company, 1963), p. 75.

> learn at his own rate, but he learns in his own special way. Because his background is different from that of another child, he will approach learning in a manner that is unique to him. Children learn in different ways and from different modes; therefore, instructional techniques used will depend a lot upon individual needs and learning styles of each student.[1]

At another point in the speech Harris talks about the relationship of teacher and student in the individualized instructional process:

> In an individualized instructional situation the teacher-student relationship takes on new dimensions and the teacher must be able to accept this. The teacher and the student become "partners" in the educational process. The "leader" and "follower" roles change into a partnership that requires a great deal of interaction as teacher and student work together in planning and evaluating the work that is to be done.[2]

The preceding quotations point out two essential aspects of the individualizing process, that is, the partnership role of teacher and student and the provision for the unique learning style of each child. This study was concerned with those same two essential aspects in terms of providing a diagnostic instrument which might aid in the partnership role and permit the recognition of and accounting for individual differences.

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[1] Aramintia V. Harris, "A Need for Teacher Preparation in Individualized Education" (paper presented at the National Society for Programmed Instruction, Washington, D. C., April, 1969), p. 6.

[2] *Ibid.*, p. 4.

The specific intent was to show the feasibility of a diagnostic test system model which could be developed by any teacher working in the individualized learning environment.

The writer felt that, if proven feasible, this diagnostic test system would provide the teacher with an objective and immediate source to aid him in prescribing or counseling the learner in the selection of media to match his unique learning style and thus promote the further projection of individualization. In this way it would promote what the writer refers to as adaptive education, the next logical step in the process of individualization.

Statement of Problem

The purpose of this study was to determine whether the diagnostic test system proposed within this study is a feasible model capable of predicting individual learning style profiles in terms of the ranked effectiveness of the media which is tested. More specifically the questions to be answered as a result of this study were:

1. Can the media diagnostic test system proposed in this study predict learning style profiles of individuals in terms of the media types or categories covered by the test?
2. Can the media diagnostic test system proposed in this study be reapplied to construct new

tests for other media types and other grade levels?

3. Can the media diagnostic test system serve as a model which the classroom teacher can utilize in developing a test or tests for his or her classroom use, within the production limitations of the average school?

Need for Research

Since the nature of this study directly concerns an operational procedure in the classroom management system it was essential to start with a model of the teaching process.

Such a model was developed by Robert Glaser in 1962 and was later simplified by De Cecco in his book, The Psychology of Learning and Instruction.

In describing this modified Glaser teaching model, De Cecco says that the model divides the teaching process into four components or parts. These components or parts in the sequence in which they occur in the learning process are:

1. Instructional objectives; the objectives which the student should attain when he has completed the instructional segment.
2. Entering behavior; the student's level before instruction begins, that is, "what he has

previously learned, his intellectual ability and development, his motivational state, and certain social and cultural determinants of his learning ability."

3. Instructional procedures, the teaching process.
4. Performance assessment; the test and observation of the student to determine if he has accomplished the instructional objectives.

De Cecco further states that a feedback loop exists in the model so that the information resulting from the final stage of the model, the performance assessment, can be used to modify the first three stages or segments[1] (see Figure 1).

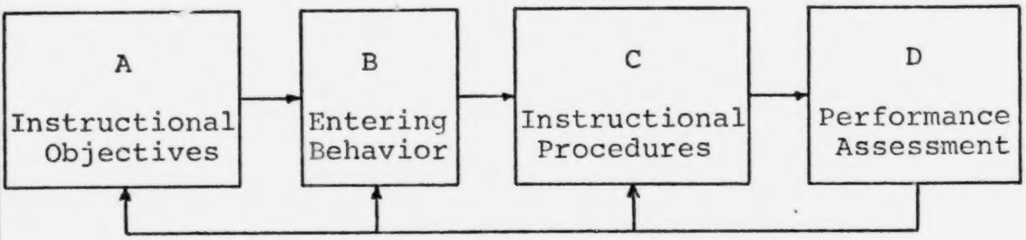
A
Instructional Objectives
B
Entering Behavior
C
Instructional Procedures
D
Performance Assessment

Fig. 1.--A basic teaching model[2]

On examining this model two obvious operational problems come to mind as one considers the individual

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[1] John P. De Cecco, The Psychology of Learning and Instruction: Educational Psychology (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1968), pp. 11-12.

[2] Ibid.

learner. First, modification to any of the three initial segments in this model comes after the student has had the educational experience. This process of modification might be acceptable if one disregards individual differences and concerns himself only with the group and group standards and needs; however, it offers little for the individual at the time when he needs it, the time of instruction. Second, the effects of each instructional procedure become part of an individual's entering behavior. However, the model fails to provide any record of the instructional process and/or its effects which might be carried forward to aid in future diagnoses.

In comparing the process of educational diagnoses to that of clinical diagnoses, Crombach says: "The selection of exercises for a clinical case is guided by the transmitted experience of previous clinicians, but the classroom teacher has no such dependable guide."[1] It is the preceding operational problems which give justification to the research conducted in this study if consideration of the individual and his needs is a significant concern in the educational process.

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[1] Lee J. Cronbach, "How Can Instruction be Adapted to Individual Differences?" Learning and Individual Differences (Columbus, Ohio: Charles E. Merrill Books, Inc., 1967), p. 29.

In speaking of the commitment to the individual and his needs Glaser says:

> Our society is committed to the significance of individual performance. Educators are aware of this, and indeed their concern with adapting to the needs of the student is a familiar theme which has been repeated over and over again and which provides the justification and basic premise for many current educational innovations and experiments. . . . It is time to pay something more than lip service to the undeniable fact that individuals do differ extensively . . . our educational system is under obligation to develop an operational capability in line with the facts of human behavior.[1]

Further, in Tyler's theory of individualization there is the implication of diagnoses and prescription when he states:

> The theory of individualized learning has commonly carried with it a notion that there are various learning needs, [this is supported by psychological research into individual differences] and that if we just made diagnoses, somewhat as a physician might do, we could identify the learning needs of the children and then provide individualized and prescribed programs for them.[2]

Tyler's theory of individualization is supported and even more strongly stated by John I. Goodlad when he says:

> Human variability demands alternatives. The sound selection of alternatives demands diagnosis of the

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[1] Robert Glaser, "The Design and Programming of Instruction," The Schools and the Challenge of Innovation (New York: McGraw-Hill Book Company, 1969), pp. 167-68.

[2] Ralph W. Tyler, "New Directions in Individualizing Instruction," The Abington Conference '67 on New Directions in Individualizing Instruction (Abington, Penn.: The Abington Conference, 1967), p. 8.

> individual and the availability of viable alternatives from which to prescribe. Diagnosis and prescription are teaching functions.[1]

Accepting the theories and implications expressed in the preceding quotations of Glaser, Tyler, and Goodlad, it would then appear that the subject of this dissertation, a media diagnostic test system, would be a valuable contribution to the implementation of individualized education in the schools of today.

Definition of Terms

One of the greatest handicaps in a study of an aspect of individualized education is the terminology which is presently common to the area. This handicap is not so much in the uniqueness of the vocabulary, but rather in the new and special meanings given to many common words. This handicap is further complicated by the fact that there is no set of consistent definitions within the framework of individualization. The terminology and definitions presented here are intended to give the reader a consistent base for interpretation of this study.

Adaptive Education.--A higher form of individualized education in which the instructional processes and goals are adapted to both the individual's learning style and level.

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[1] John I. Goodlad, "Diagnosis and Prescription in Educational Practice," Instructional Technology (New York: Holt, Rinehart and Winston, Inc., 1968), p. 65.

Determinator.--A criteria or limiting factor which is considered at the initiation of the test system, and which will control the specific characteristics of the test, such as, the type of media to be covered by the test, the vocabulary level to be used in the test and others.

Individualized Instruction.--"Differentiation of instruction according to individual differences in pupils."[1]

Media Form.--Any one of the media (radio, television, books, 16 mm sound movies, and others) which is used in a particular mode (presentation or programmed instruction mode).

Model.--"A pattern of procedure."[2]

Programed Instruction.--An ordered sequence of stimulus items, to each of which a student responds in some specified way, his responses being reinforced by immediate knowledge of results, so that the moves by small steps, therefore making few errors and practicing mostly correct responses, from what he knows, by a process of successively closer approximation, toward what he is supposed to learn from the program.[1]

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[1] Carter V. Good, ed., Dictionary of Education (New York: McGraw-Hill Book Company, 1959), p. 290.

[2] Ibid., p. 350.

System.--A set of objects together with relationships between the objects and their attributes. . . . Objects are simply the parts or components of a system, and these parts are unlimited in variety.[2]

Hypotheses

In his work "Varieties of Individual Differences in Learning," Arthur R. Jensen states that "one thing we can all be certain of: whenever in the vast realm of human learning we wish to look for individual differences, we surely will find them."[3] If one accepts the preceding statement made by Jensen and the research on individual differences which is frequently referred to in the psychological literature, then one must accept the fact that accounting for individual differences is essential in order for adaptive education to come into fruition.

Accepting the following: that each individual learner has a unique learning style based on the totality of his individual characteristics and qualities, that in the immediate future the teacher will remain the manager and/or counselor in the learning process and, that adaptive education is a worthy goal of the American educational system, the following hypotheses were offered as a base for this study:

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[1] Wilbur Schramm, Programed Instruction (New York: The Fund for the Advancement of Education, 1962), p. 2.

[2] Walter Buckley, ed., Modern Systems Research for the Behavioral Scientist (Chicago, Ill.: Aldine Publishing Company, 1968), p. 83.

[3] Arthur R. Jensen, "Varieties of Individual Differences in Learning," Learning and Individual Differences (Columbus, Ohio: Charles E. Merrill Books, Inc., 1967), p. 117.

A diagnostic media test, which is developed according to the proposed system, will produce a unique media learning style profile for each student taking the test.

The proposed diagnostic media test system, when applied at different educational levels, will produce diagnostic media tests which are equal in their effectiveness for providing individual student media learning style profiles.

Overview of the Study

This study was divided into four stages of logical sequence in order to arrive at a point in which the evidence produced in the study would support the hypotheses upon which this study was based.

First, there was developed a diagnostic media test system model which would account for the environmental variables of each learning system in which it was to be applied.

In order to keep the test system model practical for classroom application, certain limitations were placed on the model. In general these limitations concerned themselves with: the learning domain for which the system would attempt to determine effective media; the range of learning levels covered within any single learning domain; the institutional factors which would permit implementation of the test system and simplicity of implementation, so that most teachers would be able to apply the system in construction of tests for their learning situation and easily interpret the results.

In the second stage, the test system was implemented in order to determine whether the results of the test could be validated within the criteria specified in the system, and whether the implementation of the system was within the production capacity of the average teacher and school system media resource capabilities.

The third stage was the reapplication of the test system to determine if it was truly a model; that is, whether it could be reapplied under new criteria in order to produce another valid diagnostic media test for a new instructional situation. It should be noted that this third stage in the study assumed that in the second stage a valid test was produced.

The fourth stage was the specification of results, conclusions and recommendations based on the results of the first three stages.

CHAPTER II

A REVIEW OF SELECTED LITERATURE AND RESEARCH

Due to the nature of this study and the lack of comparable research at this time in the area of diagnostic media testing, this selected review is concerned with those elements which provide a base or precedent for the study.

This review is divided into the three following segments:

The first segment of the review considers what contemporary literature says about systems in general. The nature of systems is examined further to determine whether the diagnostic media test system proposed in Chapter III meets the characteristics or qualifications of a system. Besides a concern with those qualities which are necessarily found within a system, a further concern exists for the nature and qualities which allow a system to qualify as a model.

The second segment of the review is an overview of selected research, and its implications, in the realm of educational media. This overview is necessary since the study centers around a test which diagnoses the most effective media for an individual within the limitations prescribed by the system.

The third segment is a selected review of literature and research in the area of psychology. This area is included in the review because of the implications it offers in regard to the existence of individual differences and the need to account for these differences within the structure of the educational system.

There is another element which some might consider significant, the area of individualization. However, for the purpose of this study, the test precedes the individualizing process and therefore individualization is not significant to the study itself.

The review presented in this chapter is not intended as a total review of all the works in each of the areas or fields. Rather, it is intended as a representative sampling to indicate contemporary attitudes and or knowledge concerning the areas covered as well as to show the precedents which exist for the experimentation conducted in this study.

Systems

As a point of departure, it should be noted that in the latest edition of Good's Dictionary of Education, there is absolutely no reference to systems as a general term or to educational systems, a term which is quite popular in the present literature of education. The point of interest here is that the copyright date of this volume is 1959, a little over ten years ago.

The interest and possible impact that the concept of systems has had on the educational community in this short time span is evidenced in even a cursory view of the current literature. Representative of this literatuare are such statements as those given in the introduction to New Look at Education by Henry Chauncey, president of Educational Testing Service, when he says:

> It is imperative that mass education not become depersonalized education. The child must not become lost in a colossal system of fifty million others, or else we will reap a harvest of dropouts and disenchanted youths on a much larger scale than we have at the present.
>
> We have it within our grasp to achieve "education for each," but to do this will call for a newer and higher order of planning than we have so far brought to the process.[1]

And what is this higher order of planning that Chauncey is speaking of? It is the systems approach to the problems and practices of education. However, in an attempt to place the use of systems in its proper perspective, Chauncey further says:

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[1] John Pfeiffer, New Look at Education: Systems Analysis in Our Schools and Colleges (New York: The Odyssey Press, 1968), p. vii.

> It must be said that a system does not, of and by itself, produce better education. It should, however, if used seriously, present educators with the opportunity to face up more exactly to what they want to achieve, a program of how they hope to go about it, and the courage to assess honestly the outcomes of their actions.[1]

Perhaps showing less restraint, and thus more representative of the current attitude toward the use of systems in education, is a statement made by William A. Deterline in his work "Educational Systems." Deterline says:

> The exciting thing about an instructional system is that it may consist of a variety of components, procedures, and materials, each selected for a specific reason, and it will include detailed objectives and design specifications, indicating exactly how each component is to be used and exactly what it will achieve if used as specified.[2]

The acceptance of systems as a valuable tool to be used in all aspects of education could be further documented; however, the value of such additional quotations is questionable here since the main intent of this review is to show the implications of systems on this study.

Before considering these implications it is essential to determine the nature of an educational system and its particular characteristics. In their contribution to

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[1] Ibid., p. ix.

[2] Aerospace Education Foundation, Technology and Innovation in Education (New York: Frederick A. Praeger, Publisher, 1968), p. 55.

Modern Systems Research for the Behavioral Scientist, Hall and Fagen define a system as "a set of objects together with relationships between the objects and between their attributes."[1] Recognizing the inherent vagueness of their definition, Hall and Fagen attempt to clarify it by defining or elaborating on the key elements of the definition: "Objects are simply the parts or components of a system, and these parts are unlimited in variety."[2]

In expanding on the term objects, Hall and Fagen indicate two types. First are objects which are physical parts, such as atoms, stars, wires, and bones. Second are objects which are abstract such as rules, laws and processes. With regard to attributes, Hall and Fagen say that they are simply the properties of the objects. As to the element of relationships, they are defined as those things which "tie the system together."[3]

In Chapter III of this study it will be evidenced that the diagnostic media test system quite easily fulfills the requirements imposed on a system by the preceding definition. Having noted this, the next question to be considered in this phase of the review is: What does contemporary literature specify in order for a system to become a model? Exemplifying the problem which the current literature presents in terms of a definition or criteria for a model is the commentary made by Erwin P. Bettinghaus in Theory for the New Media in Education. In his contribution to this work, Bettinghaus says:

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[1] Buckley, Modern Systems Research, p. 83.

[2] Ibid.

[3] Ibid., pp. 83-84.

> Scientists use the term model in different ways. Sometimes it is substituted for terms like theory, analogy, hypothesis, and flow chart. It is given a very rigorous definition by one individual, and used very loosely by another. In the area of communication theory and process, the student soon finds himself surrounded by a rather confusing variety of definitions, charts, and sets of mathematical symbols. All are referred to as models of the communications process.[1]

This perplexing state of affairs is not limited to communications, but is rather illustrative of the present state found in the current educational literature.

Because no rigid guidelines for a model exist in education at the present, the definition of a model as stated in Chapter I "a pattern of procedure,"[2] will be accepted for this study based solely on the authority implied by its source, Good's Dictionary of Education.

Media

The area or field of concern in the second segment of this review is that of educational media. Perhaps the most representative descriptive phrase that can be cited concerning the results of the research which has gone on in the area of educational media is the chapter heading "Research and the Wonder Drug: NSD"[1] used by George N. Gordon in his book Classroom Television.

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[1] John M. Parsey, project director, Theory for the New Media in Education (East Lansing, Mich.: Educational Publication Services, College of Education, Michigan State University, 1968), p. 93.

[2] Good, Dictionary of Education, p. 350.

Although Gordon refers to television when he talks about this wonder drug NSD, the meaning and implications of the initials are substantially true for the majority of the research conducted to date on the effectiveness of various media in the process of instruction. In discussing the NSD with respect to instructional television research, Gordon says:

> One corollary theme runs like brush fire through this documentation. It is the concept that traditional educational methods (however defined) are often valueless, and that if they are eliminated, and matched groups ("traditional" vs. "new") are tested, No Significant Difference NSD in results will be demonstrable between the groups.[2]

To substantiate this position of no significant difference existing between comparative methods or media, the following excerpts are offered from a document published by the American Institutes for Research titled, Instructional Media: A Procedure for the Design of

---

[1] George N. Gordon, Classroom Television (New York: Hastings House Publishers, 1970), p. 199.

[2] Ibid., p. 200.

Multi-Media Instruction, a Critical Review of Research, and Suggestions for Future Research.

TELEVISION

Comparative Effectiveness Studies
The bulk of these studies showed no significant differences between the achievement of students taught over TV and students taught in the conventional manner. . . .

MOTION PICTURES

Comparative Effectiveness Studies
Most studies do not reveal reliable differences between instruction by films as compared to conventional methods, over a wide range of subject matter, age ranges, abilities, and conditions of use. . . . Comparative studies which put film against a medium other than face-to-face instruction are very scarce. . . .

PROGRAMMED INSTRUCTION

Comparative Effectiveness Studies
Schramm (1964) found that out of 36 studies comparing programs with conventional instruction, half (18) showed no significant difference. . . .

FILMSTRIPS, SLIDES, TRANSPARENCIES, AND OTHER PICTORIAL PRESENTATIONS

Comparative Effectiveness Studies
In his 1960 review of audiovisual communication devices, Allen (1960) concluded that the research up to that time, which compared filmstrips and slides with either silent or sound motion-picture instruction, found in general that such projected still pictures were as effective as silent or sound films in teaching factual information.[1]

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[1] Leslie J. Briggs and others, *Instructional Media: A Procedure for the Design of Multi-media Instruction, A Critical Review of Research, and Suggestions for Future Research* (Pittsburgh, Penn.: American Institutes for Research, 1967), pp. 104-29.

Further citing of individual studies and or other reviews of research on educational media would merely generate additional findings similar to those found in the American Institutes for Research document. It should not be concluded from the preceding that all of the comparative research yielded findings of no significant difference. However, it would seem that the major portion of the research resulted in this type of finding.

A point of interest is that in discussing the limitations of current media research, the American Institute for Research study points out that "to date research has not produced much generalizable information."[1] Further, in discussing the strides made in selecting most effective media based on research comparing one media with another, the study states that "actual choices of media could not be made on the bases of media research."[2]

The question might be asked whether there is any significant relationship between the previous research and the research conducted in this study. The answer to such a question is yes, and the implications are twofold. First, since comparative effectiveness studies in educational media have been accepted as a valid line of research, a precedent is established for the intent of the system described in Chapter III. Second, the research done to date in comparative effectiveness has been based on group effectiveness. However, since the comparative effectiveness aspect in this study was done on an individual student basis, the implication of the possible or probable result of no significant difference is not necessarily applicable.

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[1] *Ibid.*, p. 137.

[2] *Ibid.*

Psychology

The third and last area of selected review is the area of psychological literature and research which has implications for the uniqueness of the individual in his learning style. A keynote to the literature and research in psychology with regard to individual differences is given in the opening of Arthur R. Jensen's contribution to Learning and Individual Differences. "One thing we can all be quite certain of: Wherever in the vast realm of human learning we wish to look for individual differences, we surely will find them."[1] This attitude that individual differences do exist is further supported by the introduction to the chapter on individual differences in Readings in Educational Psychology. In this introduction the authors say:

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[1] Robert M. Gange, ed., Learning and Individual Differences (Columbus, Ohio: Charles E. Merrill Books, Inc., 1967), p. 117.

> Individuals differ from each other in every conceivable way. No two are alike. Even identical twins are different though such differences are not often readily detected. The study and measurement of individual differences is an important aspect of educational psychology. No teacher can ignore such differences. Pupils differ, emotionally, intellectually, and socially. These differences represent phases of growth and development.[1]

This concept of the individual differing from all other individuals "in every conceivable way," as the Nolls put it, is supportable by much psychological research and numerous tests. Representative of the reported research in individual differences are the work of: Lee J. Cronback and R. E. Snow, Individual Differences in Learning Ability as a Function of Instruction, Final Report Contract Number OEC 4-6-061269-1217 (1969); K. T. Hill and J. B. Dusek, "Children's Achievement Expectations as a Function of Social Reinforcement, Sex of S, and Test Anxiety," Child Development, 40:547-54 (1969); A. L. Edwards, The Measurement of Personality Traits by Scale and Inventories, New York: Holt, Rinehart and Winston, Inc., 1970; and R. F. Berdie, "Consistency and Generalizability of Intra individual Variability," Journal of Applied Psychology, 53:35-41 (1969).

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[1] Victor H. Noll and Rachel P. Noll, Readings in Educational Psychology (New York: The Macmillan Company, 1968), p. 87.

> The wealth of individual differences among students, variability in situational treatment and temporal conditions, and complexity of expressed problems cannot be ignored; variability must be accounted for.[1]

The evidence shows that individuals differ and that "the Nature of learning actually requires an individual differences approach"[2] rather than the approach of the past as described by Lee J. Cronback when he states: "Individual differences were taken into account chiefly by eliminating students."[3]

The review of psychological literature and research points out the need for additional study in the area of accounting for individual differences in the learning environment and this need establishes a precedent for this study in terms of the development of instruments which will permit insight into the unique characteristics of each individual.

Summary

Although the review is concise in nature, it points out the significant implications and possible precedents for the approach taken in this study.

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[1] Paul H. Mussen and Mark R. Rosenweig, ed., Annual Review of Psychology, Vol. XXII (Palo Alto, Calif.: Annual Review Inc., 1971), p. 553.

[2] Herbert J. Klausmeier and Chester W. Harris, ed., Analyses of Concept Learning (New York: Academic Press, 1966), p. 118.

[3] Gagne, Learning and Individual Differences, p. 20.

First, the use of systems in solving educational problems is an accepted practice in today's educational community.

Second, the characteristics and requirements of a system are such as to embrace that which is presented in Chapter III as a system.

Third, as the system proves to be a valid pattern of procedure it meets the criteria established for a model by at least one authoritative source in education.

Fourth, media research has set a precedent for comparative studies in the effectiveness of media types, but it has not established conclusive findings. Further, media research has not established the effectiveness of individual media types for individual learners, thus leaving the door wide open for such research.

Finally, psychological literature and research support the concept that each individual is different and requires education which will account for these differences in one way or another.

CHAPTER III

THE DESIGN OF THE STUDY

Introduction

As stated in Chapter I, the purpose of this study was to determine the feasibility of the proposed diagnostic media test system. More specifically, the intent of this study was to determine whether the system would provide individual student media effectiveness profiles and whether the system was applicable to different learning levels.

In this chapter the proposed system is explained in the order of its sub-step progression. In addition to the explanation of the proposed system, the methods and procedures used to determine the feasibility of the system are also described.

General Limitations

As with any system, there are certain limitations of this system which must be recognized so that it will remain a feasible entity rather than an impractical theory. The following are the limitations which were imposed on this system and thus on this study:

Population.--The population for whom the test is constructed must be some recognizable unit within an educational structure. Possible population groupings which might be considered could be age groupings, grade level groupings, class or course group spans and many others.

The main criteria to be considered is that the population for whom the test is constructed should be that population group for which the teacher is going to manage the instructional process. For the purposes of this study, and because of the latitude in the population requirements, two dissimilar academic levels were used in order to provide a wider implementation sampling and thus add to the validity of the conclusions.

Instructional Goals.--In the learning process the instructional goals describe the changes expected in the learner as a result of the instructional process. Since diagnosis and prescription may be a major factor in the control and/or modification of the instructional process, a careful consideration must be given to the types of goals to be covered within the framework of the test instrument resulting from the test system.

In order to provide a consistency and a recognized standard of learning levels, the taxonomy of educational objectives for the cognitive domain as developed by Benjamin S. Bloom and others was used for this study. It should be recognized that because of this limitation, the feasibility of this test system model is true only in the case of cognitive goals.

As to the limitation of levels within the cognitive domain, for the purpose of this study, the minimum range covered by the tests was recall through application. In the case of actual application of the system to a real learning environment, the maximum level would be determined by the maximum level within the curriculum of the real environment.

Media Categories.--In that the nature of this test system is the diagnosis of media effectiveness, the media categories covered by a test provide one of the major limitations to the system and thus to this study.

Since the intent of this system is to provide the classroom teacher with a device which he can use in his instructional environment, the media groups considered for this study were limited to those which are commonly accessible to the classroom teacher and which can be produced within the limits of the school system's production capability. This limitation is essential because the system calls for the production of media forms (slide-tape, video tape and so forth) at the teacher level.

According to the criteria presented, media forms considered for this study were: 8 mm film, audio tape, slide-tape, video tape and text. An additional expansion of these media forms was considered: media used in a programmed instruction format as opposed to the presentation format only. Since both formats are presently used within school systems, both were represented within the study.

Environmental Limitors.--The environmental factors are those limitors which are imposed by the organization and facilities of the learning environment. These limitors are such things as: the time frame in which the test can be administered (usually denoted by the time assigned to a period), the media production capability of the school system, the capacity of the teaching area for administration of the test, and the financial feasibility of producing the test. Since these limitors are critical components of the test system model, they are built in to the system for consideration in the initial stages of development.

In this study the limitors used were a fifty minute time period, which is common to many school systems, and the assumption that each medium selected for the study was within the production and administrative capacity of a hypothetical school system.

Methods and Procedures

Determinator phase

The determinator phase is the starting point of the Diagnostic Media Test system. It is in this phase that the criteria and limitations for the test to be constructed are established. As shown in Figure 2, there are four sub-steps which constitute the test determinators, that is, establish the criteria and limitations for the test under construction.

The first and most important of the sub-steps is the analysis of the test population. In view of the material presented in Chapters I and II, the assumption was made that each member of the test population comes with a unique set of entering behaviors. It is not necessary to try to determine what these behaviors are with the exception of the minimum communications level represented by any one individual making up the total test population. This minimum communications level could be determined by reviewing the most recent vocabulary scores for the standardized achievement tests in reading which are given in most schools.

This review could be accomplished by determining the lowest vocabulary level for a specific class, such as ninth year metals technology, period one; however, it would be wiser to determine the lowest vocabulary level based on a larger population. Using the same example, ninth year metals technology, the instructor might use the results from the entire ninth grade for the past two or three years, thus assuring himself of an instrument which is more

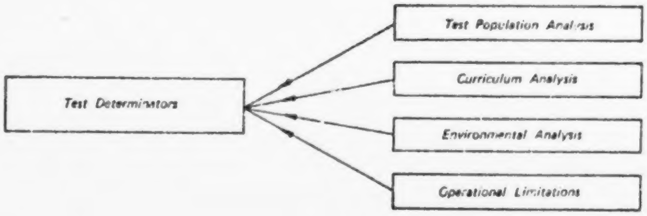
Test Determinators
Test Population Analysis
Curriculum Analysis
Environmental Analysis
Operational Limitations

Fig. 2.--Determinator phase

likely to remain useful and valid for several years. The idea of extension of the life expectancy of the test is an important one since it is probable that there will be some cost involved in the development, both monetary and time expenditure.

In this study, established minimum vocabulary levels for the test populations were used.

There is a second factor concerning the test population which must be taken into consideration at this time, particularly at the lower grade levels and in cases of special education such as classes for deaf, blind, or mentally retarded. This factor is the physical capabilities and limitations of the populous to be tested. Such information would come from the guidance personnel of the school or school system, or would be based on the teacher's own experience with a particular group of students. The caution which should be observed here is that the teacher should not underestimate the capability of the student. Therefore, the use of expert school staff members is highly recommended.

For the purpose of this study it was assumed that no media would be eliminated because of immaturity or physical and/or intellectual handicaps.

The second of the sub-steps (Figure 2) is the curriculum analysis. The intent of this sub-step is to determine the maximum objective level to be considered in the development of the test. In order to accomplish this curriculum analysis two assumptions are made: that the goals of the subject or course to be served by the test are stated in behavioral objectives, and that the person or persons doing the analysis are capable of determining the maximum level of objective within the curriculum being analyzed.

As stated in the general limitations of this study, the only domain considered for this study was that of the cognitive domain as detailed in the *Taxonomy of Educational Objectives, Handbook I: Cognitive Domain*.

The taxonomical organization used in the study was the four major classes of cognitive learning: knowledge, comprehension, application, and analysis.[1] The writer felt that a test utilizing these major classifications would provide a significant spread in the diagnostic profiles produced by the test and thus allow determination of the feasibility of the system. However, it is possible that in the actual implementation of the test system, one of the finer divisions of the taxonomy might be desirable in order to more precisely determine the most effective media. These finer divisions would almost become a necessity as fewer of the major classifications are used.

The third sub-step (Figure 2) is the environmental analysis. This step consists of taking a realistic look at the learning facility and the available media used within the facility on an individualized basis. It is from this analysis that the media types to be represented in the test are determined.

Because this study used hypothetical learning environments, it was assumed that any media type selected represented a realistic environmental component. This assumption was made so that a broad range of media could be represented in the tests conducted in this study, thus adding to the reliability of the findings of the study.

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[1] Benjamin S. Bloom, ed., Taxonomy of Educational Objectives - Handbook I: Cognitive Domain (New York: David McKay Company, Inc., 1956), p. 18.

The fourth and last of the determinator sub-steps (Figure 2) is the determination of the operational limitors. These represent time and physical restrictions as well as any organizational or administrative rulings which might have an effect on the implementation of the test system. There are many possible restrictions which might affect the system. One example is the case where the time period in which the test could be administered is only thirty minutes. Because this period is considerably shorter than the typical period of fifty minutes, the duration of test segments and/or number of media covered would necessarily be reduced. Another such example which might affect the construction of the test is a restriction of facility such as inadequate electrical power outlets, thus limiting the number of media hardware which require electrical power.

As to the tests developed as part of this study, the only operational limit considered was that the hypothetical time period for the test was fifty minutes.

Because the four sub-steps which make up the determinator phase are critical to the development of the diagnostic media test system, the following Test Criteria Determinator Work Sheet was developed by the writer and is offered (Exhibit I, next page) as an instrument which might be used to aid in the performance of this initial step in

Exhibit I

Test Criteria Determinator Work Sheet

Date____________________

Course Title____________________________

Characteristics of the test population:

1. Age range of the test population ___years to ___years

2. Minimum reading vocabulary level for test population
   a) present test population ____years ____months
   b) past populations ____years ____months

3. Unique test population limiting characteristics: (Mark those applicable)
   ( ) None
   ( ) Total Blindness
   ( ) Partial Blindness
   ( ) Total Deafness
   ( ) Partial Deafness
   ( ) Mental Retardation
   ( ) Physically Handicapped
   ( ) Physically Immature
   ( ) Other

4. If any marks occur in item 3, list media and hardware limitations.
   a) Media not applicable to the test population

   b) Media hardware types not applicable to the test population

5. Curriculum analysis in terms of maximum cognitive learning goal or objective (mark highest level expected within the curriculum)
   ( ) Knowledge
   ( ) Comprehension
   ( ) Application
   ( ) Analysis
   ( ) Synthesis
   ( ) Evaluation

In some cases a finer breakdown might be used.

6. Learning environmental limitations

1) Media types and modes available for individual use (Place a mark in the appropriate mode column after each media which is available or will be available in sufficient quantity to justify consideration for prescription.)

Media Type	Presentation Mode	Programmed Mode
Text	( )	( )
Movie 8 mm silent	( )	( )
Movie 8 mm sound	( )	( )
Movie 16 mm silent	( )	( )
Movie 16 mm sound	( )	( )
Audio Tape	( )	( )
Video Tape	( )	( )
Filmstrip (sound)	( )	( )
Filmstrip (silent)	( )	( )
Slides	( )	( )
Slides/audio tape	( )	( )
Games	( )	( )
Computer Assisted Instruction	( )	( )
Other______________________	( )	( )

7. Operational limitations

1) Maximum time available for administration of test ____minutes

2) Media hardware available on a full time basis for prescriptive use (list here)

3) Media hardware available on a restricted basis for prescriptive use (list here)

4) Special administrative rules or policy restrictions which would prevent use of any media type (list restricted media here)

5) Facility limitations which prevent the use of any media type on a prescriptive basis (list restricted media here)

the system. Upon examination of this instrument, one will find that it covers each of the four sub-steps of the determinator phase and provides a directed evaluation of all the conditions and previously described factors in this phase.

As a matter of operational procedure the Test Criteria Determinator Work Sheet was used within this study to describe each of the hypothetical learning environments; however, it should be pointed out that the results of the study in no way contribute to or deny the value of this instrument as a working document for this system.

Formulation of test objectives

With the completion of the test determinator phase, the next stage in the system is undertaken. The data from the determinator phase feeds into the formulation of test objectives stage (see Figure 3) and provides a guide to the formulation of the test objectives.

The key data which must be considered in this stage is the maximum level of cognitive learning to be covered in the test and the maximum time allotted for the test administration.

If the test is to provide a fine scale of effectiveness, it is necessary to have a sufficient spread of

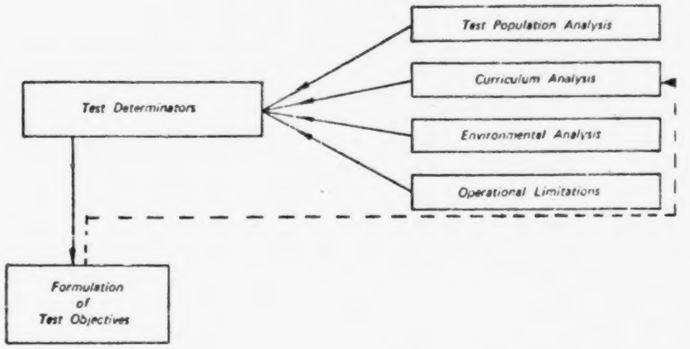

Test Population Analysis
Curriculum Analysis
Test Determinators
Environmental Analysis
Operational Limitations
Formulation
of
Test Objectives

Fig. 3.--Formulation of test objectives

objectives and test items in order to permit an accurate determination of the level at which effectiveness ceases for each media being covered. However, from a practical standpoint there is only X amount of time available to administer the test. Therefore, the spread of objectives must be tempered by the available time so that the finished test instrument will remain usable.

After reviewing the determinator limitations, the objectives for the test are to be written. These objectives are to be specified in behavioral terms. However, they must be sufficiently general in their nature to allow for the differences in specific data provided in each of the different instructional sequences used per media type covered by the test. Examples of the type of objectives which could be used in the system and were used for the test instrument in this study are as follows:

1. Knowledge

   After (specification of appropriate verb and media type) you will be able to recall terms, facts, methods and theories presented in this (specify instructional media).
2. Comprehension

   After (specification of appropriate verb and media type) you will be able to identify statements as correct or incorrect based on the information presented.
3. Application

   After (specification of appropriate verb and media type) you will be able to apply to new situations, the rules, principles or theories presented.
4. Analysis

   After (specification of appropriate verb and media type) you will be able to analyze statements and determine if they are true based on the information presented in the (specify media).

With the completion of the test objectives, a process of feedback cross-check will be undertaken. This process is indicated (Figure 3) by the dotted line which occurs between the test objectives and the curriculum analysis sub-step of the determinator phase. In this process the objectives which have been formulated for the diagnostic media test will be cross-checked with the levels found to be existent through the curriculum analysis.

Construction of model teaching sequence

With the test objective/curriculum analysis cross-check complete, the next stage, the construction of a model teaching sequence (A) will be undertaken (Figure 4). The key to this stage is the development of a teaching sequence or format which will allow the introduction of completely fictitious data, ideas, principles, theories and other components. The reason for fictitious information being used is to eliminate the possibility of the student drawing on his past learning. The sequence also must be adaptable to the various media forms covered by the test.

The procedure employed for this step in the developmental stage of the study was the writing of a fictitious instructional sequence. This sequence used the previously developed objectives as guides to the type of information included. After the sequence was written, it was cross-checked to determine whether it permitted the accomplishment of the objectives specified for the test. When it was determined that it would provide for each of the objectives,

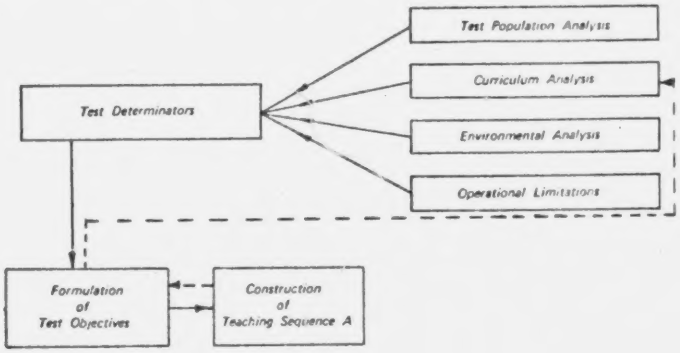

Test Population Analysis
Curriculum Analysis
Test Determinators
Environmental Analysis
Operational Limitations
Formulation of Test Objectives
Construction of Teaching Sequence A

Fig. 4.--Construction of model teaching sequence

the sequence was adopted for the test. When it did not permit accomplishment of any or all of the objectives, the sequence was rewritten. The following is an example of the type of teaching sequence which was developed and used:

EXAMPLE TEACHING SEQUENCE

TREEOLOGY

The study of Treeology is essential for the people of Tall Oak, an island which is located in the South Atlantic Ocean. Based on the science of Treeology, the people of Tall Oak have been able to develop some of the most unusual and desirable fruit in the entire world, thus maintaining a thriving agricultural economy.

Since all the people of Tall Oak are engaged in the production of these unusual fruits, the study of Treeology has become a basic subject in the government established curriculum which is studied by all children, under 12, living on Tall Oak.

The principle of Treeology is: When two fruit bearing trees are placed in the proper relationship to each other and planted under the proper conditions, the fruit of each tree will exhibit 2/3 of the characteristics of the adjacent tree and 1/3 of its own characteristics.

Unfortunately for the rest of the world, but fortunately for Tall Oak, the principle of Treeology only applies to the island of Tall Oak where the botanical conditions are correct for this scientific phenomenon to take place.

The people of Tall Oak have used this principle of Treeology to develop their only export. However, in order to assure themselves of the desired product, it is necessary that the following rules be observed.

The first rule is that all trees must be planted in a north-south relationship. This north-south relationship must be arranged so that the tree with the first letter of its common name closest to the beginning of the alphabet will always be south of the other tree. Also, no two trees having the same first letter can be planted next to each other in this north-south relationship and bear fruit.

The second rule is that trees which are to be planted for the purpose of producing the unusual Tall

Oakian fruits must be between the ages of five and seven years old at the time of planting. If the trees are disturbed once this planting has taken place, the tree closest to the south will always die.

The third rule states that all trees which are to exhibit the results of the Treeology principle must be planted on the first day after a full moon. Since the climate for growing is suitable all year round on Tall Oak, this planting can occur after any new moon.

Formulation of question format

With the satisfactory development of the primary teaching sequence (Figure 4, sequence A), the next step in the system was undertaken. As shown in Figure 5 there are two possible alternative directions in which the procedure may go; however, it is felt that the formulation of test question format is the preferable direction of procedure, since it provides a cross-check on the last three steps. Thus the development of the test question format was the next step undertaken in this study.

It will be recalled that the objectives stated earlier establish the level of accomplishment expected of the learner after he has been instructed through a specific media. Now using these same objectives and the primary teaching sequence, a test question format is developed. It

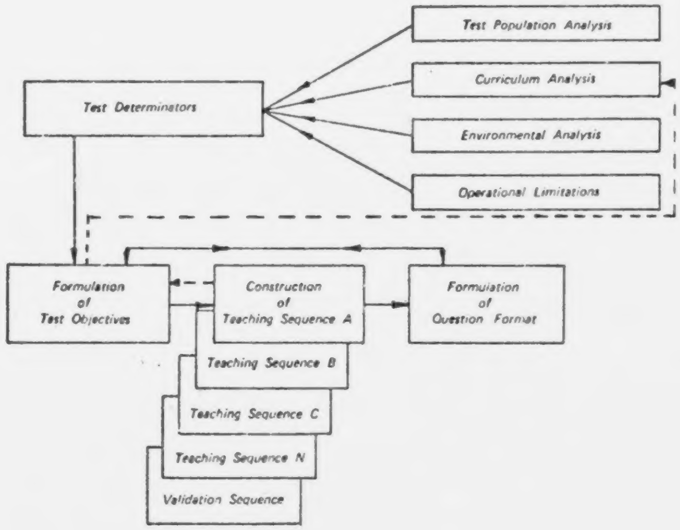

Test Population Analysis
Curriculum Analysis
Test Determinators
Environmental Analysis
Operational Limitations
Formulation of Test Objectives
Construction of Teaching Sequence A
Formulation of Question Format
Teaching Sequence B
Teaching Sequence C
Teaching Sequence N
Validation Sequence

Fig. 5.--Formulation of question format

will allow for the inclusion of the specifics occurring in each mediated sequence. Exemplifying this basic question format are the following with notations as to the corresponding objective level they are to measure:

EXAMPLE QUESTION FORMAT

Knowledge 1. The name of the science described in the materials just presented was ___________.

A)

B)

C)

D)

Knowledge	2.	The science described in the presentation was developed in the country of ________________. A) B) C) D)
Knowledge	3.	The practice of this science is essential to the country's ________________. A) B) C) D)
Comprehension	4.	Which of the following statements is (not) a rule covering the application of the science described in the presentation? A) B) C) D)
Comprehension	5.	Which of the following statements best (least) describes the country in the presentation? A) B) C) D)
Application	6.	If the proper conditions are observed, and the principle described in the presentation is applied, the product of ______________ and ____________ would be:

A)
B)
C)
D)

(In this case the blank spaces are to be filled in, by the test developer, with specific data applicable to the particular teaching sequence being tested)

Analysis 7. Based on the presentation, which of the following is most (least) likely to be true?

A)
B)
C)
D)

Construction of teaching sequences

With the completion of the preceding steps, the determinator phase, formulation of the test objectives, construction of the primary or model teaching sequence (A), and the formulation of the question format, the next, and perhaps most critical, step in the process is ready to be undertaken.

Generating out of the primary or model teaching sequence (A) are a series of sub-developments or steps (Figure 6). The number of sub-steps here (including the primary sequence (A) will be equal to the number of media which will be covered in the test plus one additional sub-step to cover the validation process. The exact number of sub-steps will be determined by referring to the environmental analysis sub-step of the determinator phase in which this information was specified previously. Also, if

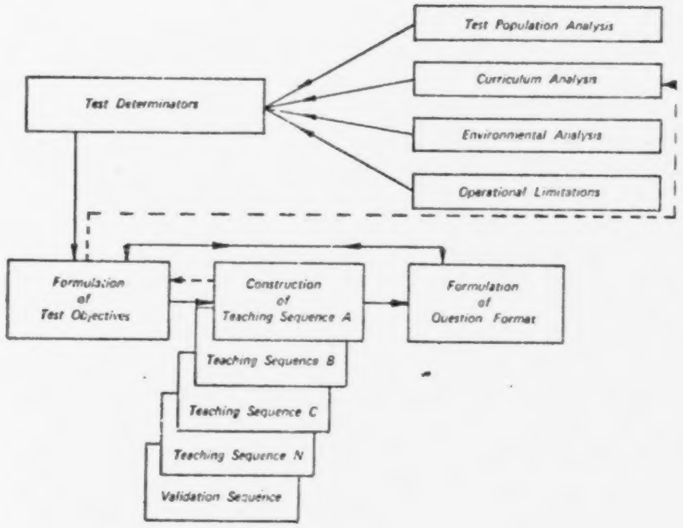

Test Population Analysis
Curriculum Analysis
Test Determinators
Environmental Analysis
Operational Limitations
Formulation of Test Objectives
Construction of Teaching Sequence A
Formulation of Question Format
Teaching Sequence B
Teaching Sequence C
Teaching Sequence N
Validation Sequence

Fig. 6.--Development of teaching sequences

the Test Criteria Determinator Work Sheet has been used, its learning environmental limitors section will provide the information needed at this stage.

For the purpose of this study, the number of media covered by either of the tests developed in this study was limited to three media forms.

As mentioned earlier, the development of the sub-teaching sequences is perhaps the most critical step in this system. The procedure in this process is to write a series of teaching sequences which are equal to the primary sequence, but which differ in the specifics included in each sequence. Also, as was demonstrated in the example of the primary sequence which was presented earlier (Treeology), each sequence which is developed must be fictitious so as not to draw on or reflect the effects of past learning.

The following is an example of a sub-step teaching sequence built on the model provided by the primary sequence. It is important to note that the style of format, as well as the order of presentation, of this second sequence is exactly like that of the model. It should also be noted that even though the specifics have changed, they are still equal in level to those found in the model.

EXAMPLE OF SECOND TEACHING SEQUENCE

ROADOLOGY

Roadology is the name given to the sophisticated transportation system developed in the East Asian country of Rexan.

The people of Rexan have been able to maintain one of the most lucrative tourism economies in the entire world, based on the curious interest of outsiders in their science of Roadology.

Because more than 50 per cent of the adults over the age of twenty-one are involved in some phase of the tourism industry, the study of Roadology is a required course for all high school students who are resident citizens of Rexan.

The principle of Roadology is: when thermo-magnetic power sources are used in Rexanian transportation vehicles, all such vehicles will always remain 100 feet behind any other vehicles and ten feet away from any other object to its side, if they are operated within the proper rules.

Unfortunately for the rest of the world the principle of the thermo-magnetic power source has been kept a closely guarded secret in the land-locked country of Rexan, where it was developed, thus making Roadology an ideal tourist attraction.

For residents and tourists of Rexan to use the principle of Roadology, and thus promote the main industry of tourism, the following rules must be closely observed.

The first rule is that non thermo-magnetic powered vehicles must remain in those lanes of the road which are colored red.

By restricting non thermo-magnetic vehicles to their red lanes, there is no chance of a non thermo-magnetic powered vehicle running into a thermo-magnetic vehicle ahead of it.

Also, thermo-magnetic vehicles are restricted from operating in the red lanes because statistics show a 99 per cent chance that an accident will happen if they are driven in the red lanes.

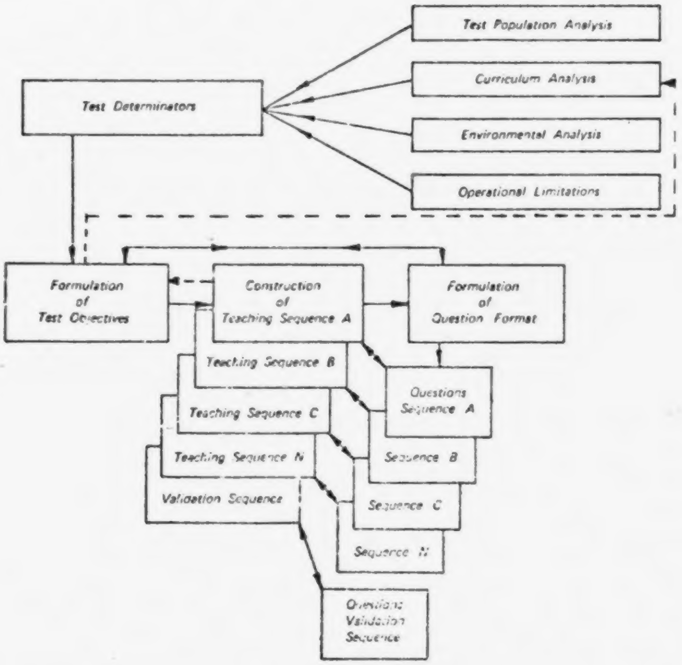
The second rule is that all operators of thermomagnetic vehicles must be over the age of thirty (30). If the operator is under thirty years old, the radiation from the power source causes a rapid aging process which will terminate in death within twenty-four hours.

The third and last rule states that all thermomagnetic vehicles must be operated after sunrise and before sunset for the principle of roadology to hold true. The geographical location of the country is ideal for the use of this principle, since there is a period of only four (4) hours each day when the sun does not shine on this lovely country.

Writing test questions

The next step in the system provides another cross-check on the equality of the teaching sequences before any of the media are developed for use in the actual test. This cross-check is constituted by the writing of the test questions for each sequence to be used in the test (Figure 7).

In the case of the question format presented earlier, there were no specifics included. Now, in this stage, the specifics are added. If the questions from any teaching sequence cannot be made to conform to the format


Test Population Analysis
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Curriculum Analysis
Environmental Analysis
Operational Limitations
Formulation of Test Objectives
Construction of Teaching Sequence A
Formulation of Question Format
Teaching Sequence B
Questions Sequence A
Teaching Sequence C
Teaching Sequence N
Sequence B
Validation Sequence
Sequence C
Sequence N
Questions Validation Sequence

Fig. 7.--Writing of specific test questions

established earlier, it will be assumed that the teaching sequence is not equal to the primary sequence and must, therefore, be changed. The following are examples of questions which were developed from the question format and teaching sequences presented earlier and which were used in this study.

TEST QUESTIONS FROM THE TEACHING SEQUENCES

TREEOLOGY

___ 1. The name of the science described in the materials just presented was_____________________.

53

A) Flowerology

B) Roadology

C) Treeology

D) Metalology

E) None of the above

___ 2. The science described in the presentation was developed in the country of ________________.

A) Tall Island

B) Tall Oak

C) Small Oak

D) Small Island

E) None of the above

___ 3. The practice of this science is essential to the country's ______________________________.

A) tourist economy

B) industrial economy

C) agricultural economy

D) educational program

E) none of the above

___ 4. Which of the following statements is not a rule covering the application of the science described in the presentation?

A) Trees must be planted in a north-south relationship to bear the special fruit.

B) Trees must be planted between the ages of 5 and 7 years to bear the special fruit.

C) The tree whose common name begins with the letter closest to the beginning of the alphabet must be planted closest to the south.

D) For the trees to bear the special fruit they must be planted one day before the new moon.

E) None of the above

___ 5. Which of the following statements best describes the country in the presentation?

A) The country is land-locked in the south of Africa.

B) The country is an island in the North Atlantic.

C) The country is an island in the South Atlantic.

D) The country is a coastal country facing the South Atlantic.

E) None of the above.

___ 6. If the proper conditions are observed, and the principle described in the presentation is applied, the product of an apple tree and a pear tree would be __________________.

A) 2/3 apple and 1/3 pear on the apple tree

B) 1/2 apple and 1/2 pear on the pear tree

C) 2/3 apple and 1/3 pear on the pear tree and 1/3 apple and 2/3 pear on the apple tree

D) 2/3 apple and 1/3 pear on the pear tree and 2/3 apple and 1/3 pear on the apple tree

E) None of the above.

___ 7. Based on the presentation, which of the following is most likely to be true?

A) Trees which are planted after the age of 7 years will probably die.

B) A tree which is planted on a day other than the first day before the full moon will not bear fruit.

C) If a pear and a peach tree are planted in a north-south relationship, the pear tree will probably not bear fruit.

D) Two trees must be planted in a north-south relationship if they are to bear any fruit.

E) None of the above.

ROADOLOGY

___ 1. The name of the science described in the materials just presented was ____________________.

A) Flowerology

B) Treeology

C) Carology

D) Metalology

E) None of the above

___ 2. The science described in the presentation was developed in the country of ________________.

A) Reo
B) Rattan
C) Rexan
D) Runner
E) None of the above

___ 3. The practice of this science is essential to the country's ____________________.

A) tourist economy
B) industrial economy
C) agricultural economy
D) educational program
E) none of the above

___ 4. Which of the following statements is not a rule covering the application of the science described in the presentation?

A) Thermo-magnetic powered vehicles must remain in those lanes of the road which are not colored red.
B) Thermo-magnetic powered vehicles must be operated before sunset and after sunrise.
C) Non thermo-magnetic powered vehicles are restricted to operating only in the red lanes of the road.
D) Operators of thermo-magnetic vehicles must be under the age of thirty years to prevent radiation caused aging.
E) None of the above.

___ 5. Which of the following statements best describes the country in the presentation?

A) The country is land-locked in West Asia.
B) The country is an island off the coast of East Asia.
C) The country is a coastal country in West Asia.
D) The country is a land-locked country in East Asia.

E) None of the above.

___ 6. If the proper conditions are observed, and the principle described in the presentation is applied, the result of a thermo-magnetic powered vehicle following a non thermo-magnetic vehicle in the red lane would be ________________________.

A) that of forcing the non thermo-magnetic vehicle off the road

B) an unavoidable accident

C) a constant distance of 100 feet maintained between the two vehicles

D) a rapid aging of the dirver of the thermo-magnetic vehicle

E) none of the above

___ 7. Based on the presentation, which of the following is most likely to be true?

A) Thermo-magnetic vehicles are safer operating in the red lanes than non thermo-magnetic vehicle operated in lanes which are not red.

B) A thermo-magnetic vehicle which is operated by a driver under 30 years of age, after sunset, has a 99 per cent chance of being involved in an accident.

C) A thermo-magnetic vehicle operating in its proper lane and traveling at a rate of 60 miles per hour will cause any other vehicle in front of it to also travel at 60 miles per hour.

D) A non thermo-magnetic vehicle which is operated by a driver under the age of 30 years, in a lane other than a red lane, will suffer from a rapid aging process and die within 24 hours.

E) None of the above.

Media development

When it was determined, as described previously, that the teaching and validation sequences and the test questions for each are equal, media development was undertaken (Figure 8). A separate media form was used to

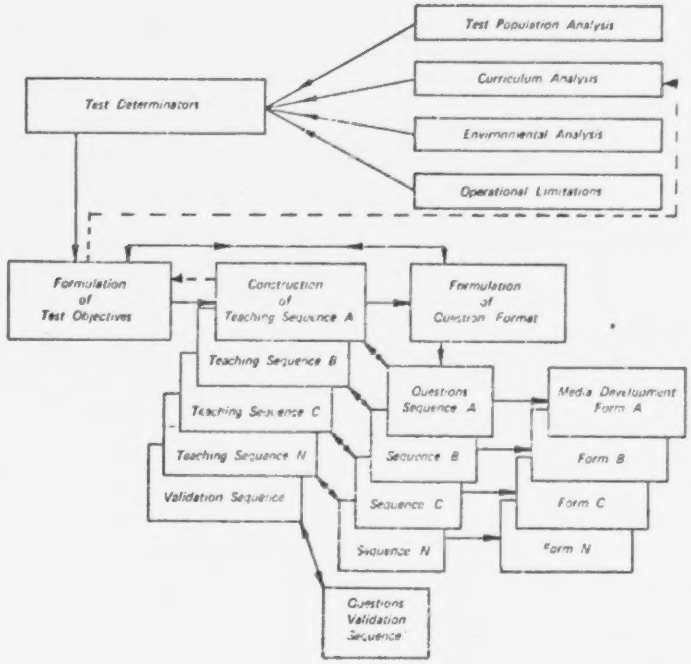

Test Population Analysis
Curriculum Analysis
Test Determinators
Environmental Analysis
Operational Limitations
Formulation of Test Objectives
Construction of Teaching Sequence A
Formulation of Question Format
Teaching Sequence B
Teaching Sequence C
Teaching Sequence N
Validation Sequence
Questions Sequence A
Sequence B
Sequence C
Sequence N
Media Development Form A
Form B
Form C
Form N
Questions Validation Sequence

Fig. 8.--Development of media forms

communicate the content of each teaching sequence in the main part of the test. The specific media forms used, it will be recalled, were determined at an earlier stage in the system. Each media form included the following: specification of the objectives to be attained as a result of the teaching sequence, the teaching sequence, and the administration of the test questions. The test for all sequences used in this study were given in the form of a test booklet and required the individual to read the questions for himself and respond on an answer sheet.

At this point the test should be ready for use in producing the individual media diagnostic test profiles (Figure 9). However, since the total system calls for a validation phase, this phase should be completely developed before the test is administered.

Validation phase development

The development of the validation phase (Figure 10) is similar to the main test development with one exception. In the main phase a different media form was used for each teaching sequence. In the validation phase each media form is used to communicate the same teaching sequence.

For this study the tests developed contain a minimum of three main teaching sequences utilizing three different media in the main test and one teaching sequence presented through three different media in the validation phase.

Administration phase

With the diagnostic media test and the validation tests complete, the administration phase (Figure 11) is undertaken. In this administration phase, the diagnostic media test is given to the test population. After the test

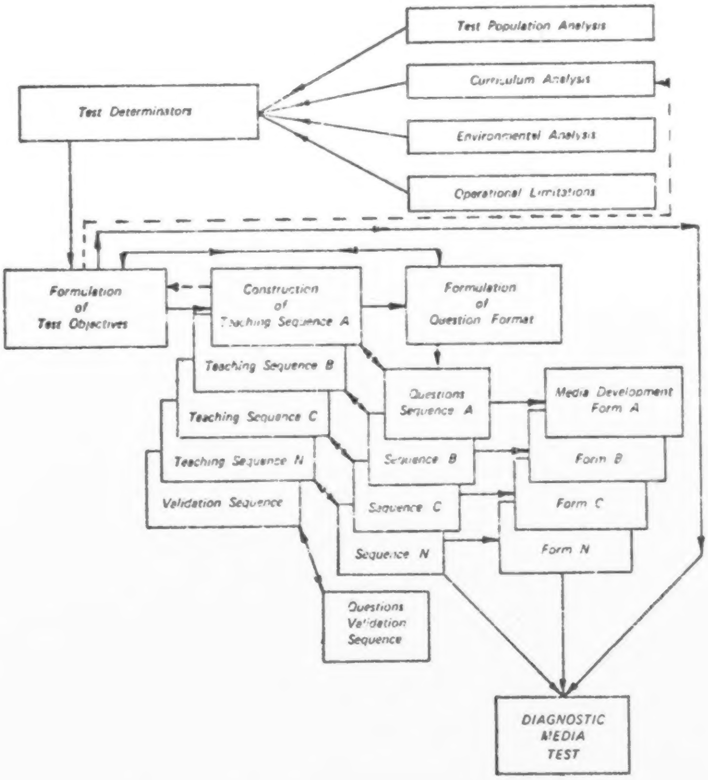

Test Population Analysis
Curriculum Analysis
Test Determinators
Environmental Analysis
Operational Limitations
Formulation of Test Objectives
Construction of Teaching Sequence A
Formulation of Question Format
Teaching Sequence B
Teaching Sequence C
Teaching Sequence N
Validation Sequence
Questions Sequence A
Sequence B
Sequence C
Sequence N
Media Development Form A
Form B
Form C
Form N
Questions Validation Sequence
DIAGNOSTIC MEDIA TEST

Fig. 9.--Assembly of the diagnostic media test

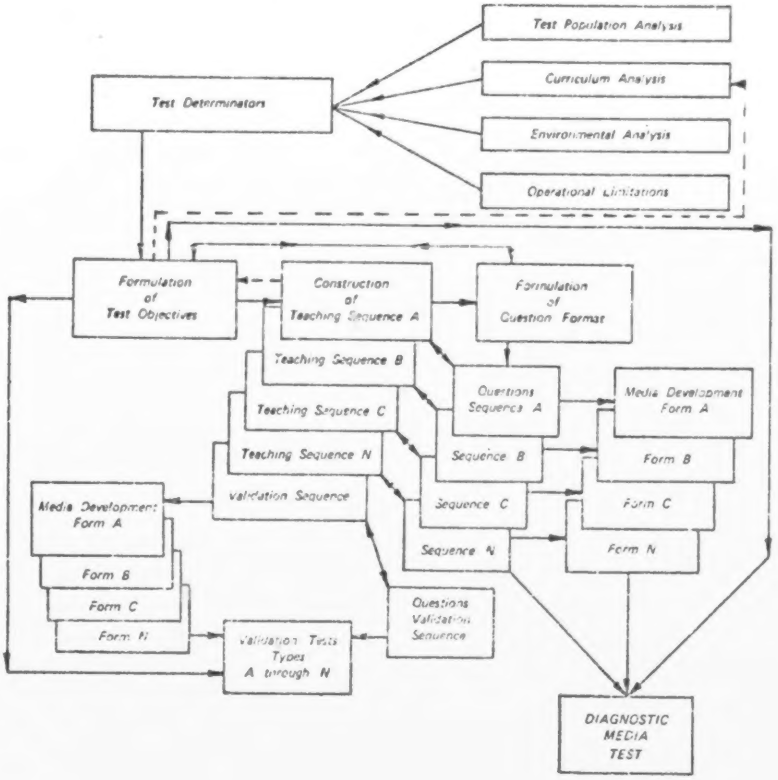
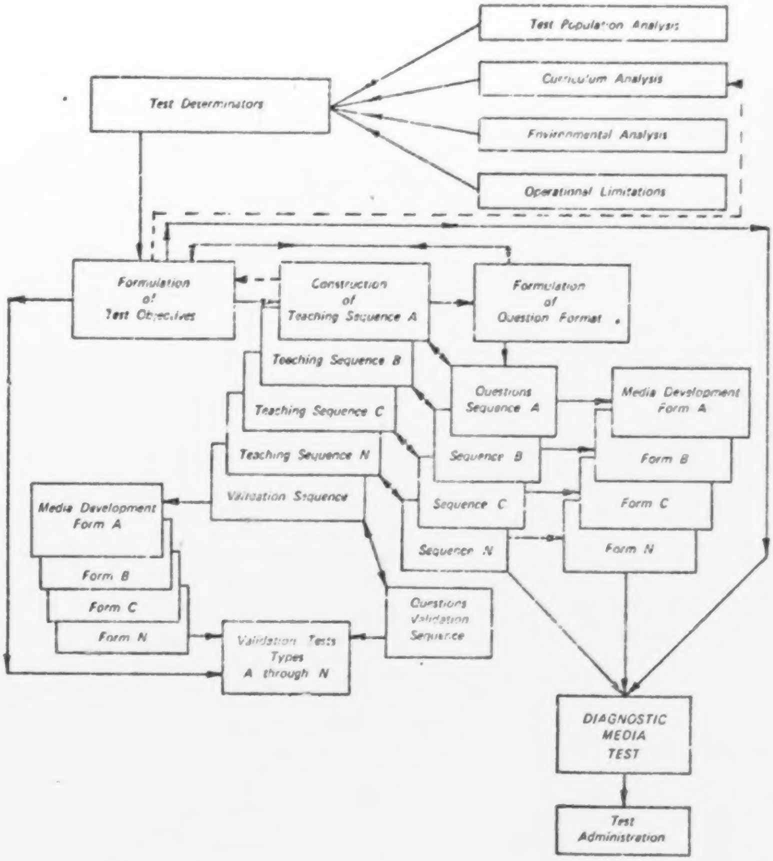

Test Population Analysis
Curriculum Analysis
Environmental Analysis
Operational Limitations
Test Determinators
Formulation of Test Objectives
Construction of Teaching Sequence A
Formulation of Question Format
Teaching Sequence B
Teaching Sequence C
Teaching Sequence N
Validation Sequence
Questions Sequence A
Sequence B
Sequence C
Sequence N
Media Development Form A
Form B
Form C
Form N
Media Development Form A
Form B
Form C
Form N
Questions Validation Sequence
Validation Tests Types A through N
DIAGNOSTIC MEDIA TEST

Fig. 10.--Validation phase development


Test Population Analysis
Test Determinators
Curriculum Analysis
Environmental Analysis
Operational Limitations
Formulation of Test Objectives
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Formulation of Question Format
Teaching Sequence B
Teaching Sequence C
Teaching Sequence N
Validation Sequence
Questions Sequence A
Sequence B
Sequence C
Sequence N
Media Development Form A
Form B
Form C
Form N
Media Development Form A
Form B
Form C
Form N
Questions Validation Sequence
Validation Tests Types A through N
DIAGNOSTIC MEDIA TEST
Test Administration

Fig. 11.--Diagnostic media test administration is given each test for the individual is scored, and the results recorded on the effectiveness profile sheet.

Exhibit 2 is an example of the proposed profile sheet in terms of its basic format, while exhibit 3 shows a hypothetical profile sheet which has been filled in for an individual who has taken a diagnostic media test. As can be seen in the hypothetical exhibit 3, the diagnostic profile offers a comparative view of the media effectiveness for those media forms covered by the test.

Validation phase

While the complete profile will probably be valuable in the actual classroom situation, for this study and the validation phase of the system, the only part of the profile considered was the media form designated as being most effective. It is based on this diagnosis, the media Effectiveness Profile Distribution, (Figure 12) that the individual is given one of the validation instruction and testing sequences (Figure 12). For example, student Johnson in exhibit 3, as a result of a media diagnostic test, shows television presentations as his most effective media form. Thus, in the validation phase student Johnson would be retested with the television type validation test. If the Diagnostic Media Test system is followed, the validation test style, level, and question format should be equal to those of the Diagnostic Media Test. Therefore,

Exhibit 2

Diagnostic Media Test Profile

Student Name ____________________ Student Number __________

Date Tested ___/___/___ Group Designation ______________

Media Form / Learning Level					Validation Form
Knowledge	(1)				
	(1)				
	(1)				
Comprehension	(2)				
	(2)				
	(2)				
Application	(3)				
	(3)				
	(3)				
Analysis	(4)				
	(4)				
	(4)				
Synthesis	(5)				
	(5)				
	(5)				
Evaluation	(6)				
	(6)				
	(6)				
Total Points per Media Form					

Highest Scoring Media Form ______________ Score ______

Validation Score ______

Exhibit 3

Diagnostic Media Test Profile

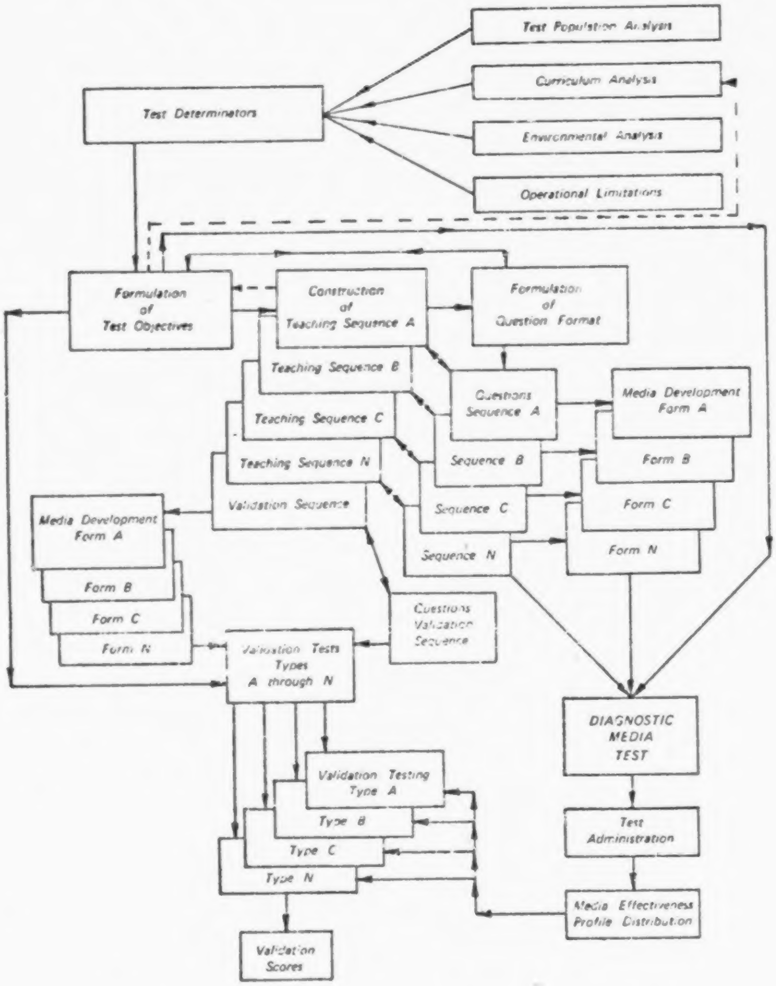
Student Name Johnson, Morris Student Number 86311

Date Tested 2 / 12/ 71 Group Designation IA 70

Learning Level \ Media Form		Slide Tape	Television	Text	Validation Form Television
Knowledge	(1)	1	1	1	1
	(1)	1	1		1
	(1)	1		1	1
Comprehension	(2)	2	2	2	2
	(2)	2	2		2
	(2)		2		2
Application	(3)	3	3		3
	(3)	3	3		3
	(3)		3		3
Analysis	(4)		4		4
	(4)	4	4		4
	(4)		4	4	4
Synthesis	(5)				
	(5)				
	(5)				
Evaluation	(6)				
	(6)				
	(6)				
Total Points per Media Form		17	29	8	30

Highest Scoring Media Form Television Score 29

Validation Score 30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Teaching Sequence C
Teaching Sequence N
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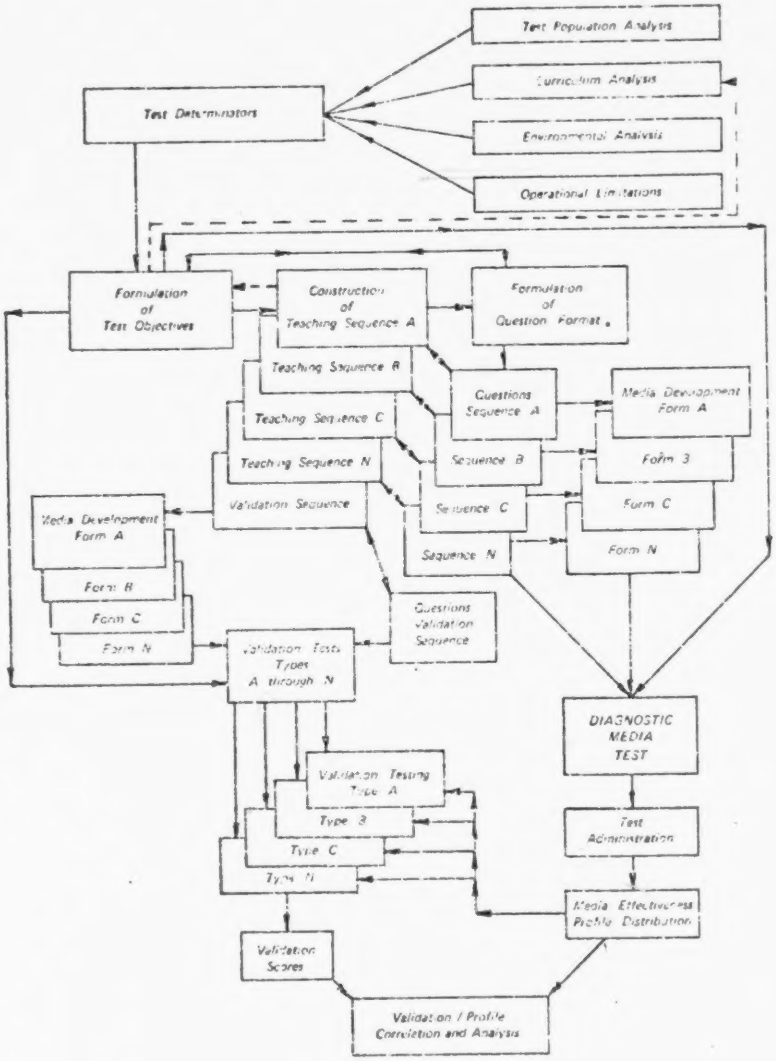
Questions Sequence A
Sequence B
Sequence C
Sequence N
Media Development Form A
Form B
Form C
Form N
Media Development Form A
Form B
Form C
Form N
Questions Validation Sequence
Validation Tests Types A through N
Validation Testing Type A
Type B
Type C
Type N
Validation Scores
DIAGNOSTIC MEDIA TEST
Test Administration
Media Effectiveness Profile Distribution

Fig. 12.--Validation testing

results of this validation phase should correlate highly with the results of the Diagnostic Media Test, within the limits of the most effective media (Figure 13).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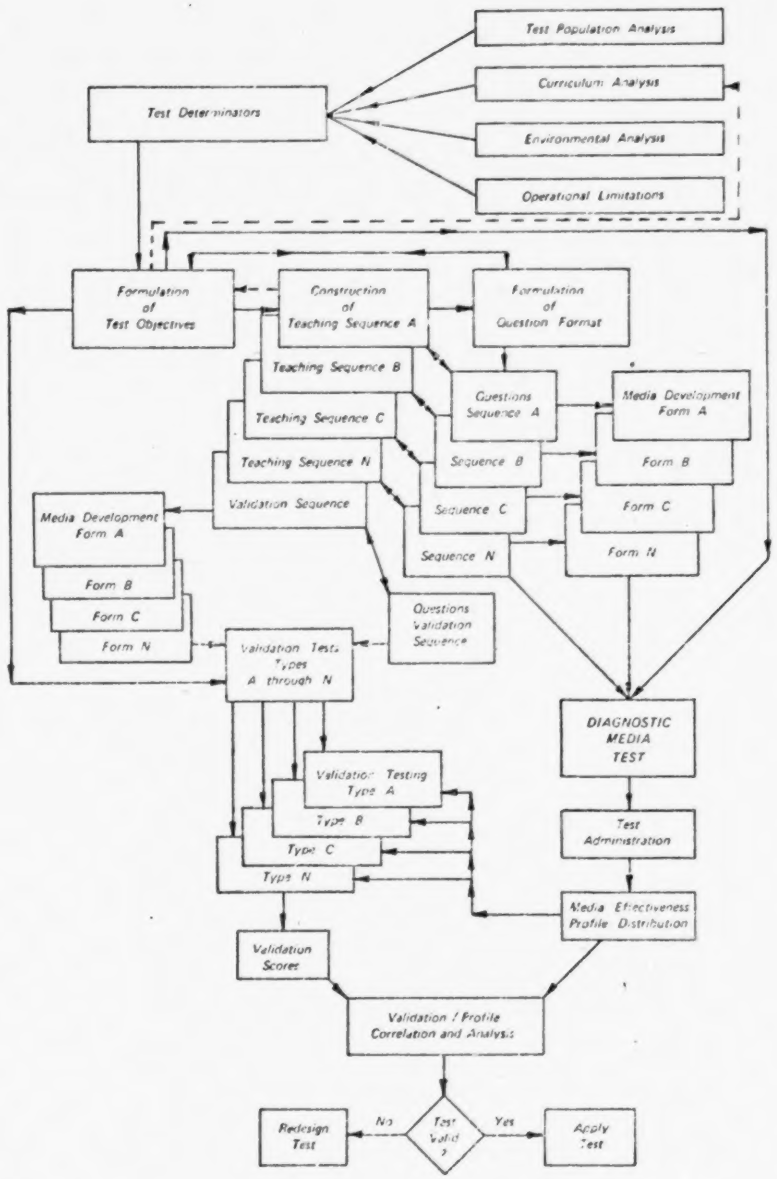
Teaching Sequence B
Teaching Sequence C
Teaching Sequence N
Validation Sequence
Questions Sequence A
Sequence B
Sequence C
Sequence N
Media Development Form A
Form 3
Form C
Form N
Media Development Form A
Form B
Form C
Form N
Questions Validation Sequence
Validation Tests Types A through N
DIAGNOSTIC MEDIA TEST
Validation Testing Type A
Type B
Type C
Type N
Test Administration
Media Effectiveness Profile Distribution
Validation Scores
Validation / Profile Correlation and Analysis

Fig. 13.--Validation and profile correlation

In this study the correlation was determined through the use of the Pearson Product-Moment correlation coefficient. If the r between the scores of the Diagnostic Media Test and the Validation Test for the individuals making up the test population was +0.70 or higher, the test was to be considered valid. Further, validity was to be accepted as an indication that the system is capable of producing a diagnostic media test which can predict the most effective media form for an individual.

Assuming that the correlation indicates that a test is valid, then the results could be implemented in the teaching situation to prescribe or guide the individual in the selection of the most effective media form for him. If on the other hand the test should prove to be invalid within the limits previously stated, the test would be reworked or redeveloped (Figure 14).

In this study even though the necessary correlation was achieved on the first test, a second test was developed in the same manner, with the exception of the specifics used in the determinator phase. The changes made in this phase were in terms of the population which the test was designed for and the specific media forms used. There was one different media form used in this second test.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Form C
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Questions Validation Sequence
Validation Tests Types A through N
DIAGNOSTIC MEDIA TEST
Validation Testing Type A
Type B
Type C
Type N
Test Administration
Media Effectiveness Profile Distribution
Validation Scores
Validation / Profile Correlation and Analysis
Test Valid ?
No
Yes
Redesign Test
Apply Test

Fig. 14.--Application of test analysis

Since the results of the first and second test surpassed the prescribed correlation standards, the proposed media diagnostic test system is considered a model system which could be applied according to the limits already established. If the results of both tests had not met the correlation standard established, then the system would have been considered non-feasible and the hypothesis rejected.

If one of the tests had met the correlation standard and one had not, the test not meeting the standard would have been redeveloped once again and used with a new population. If the correlation standard was achieved after this redevelopment, then the errors made in the first would have been noted and the conclusion would have been the same as if both tests had achieved the necessary correlation the first time. If however, after redevelopment, the second test still did not achieve the necessary correlation standard, the conclusion would have been that the system was not a model and therefore was not a feasible system.

CHAPTER IV

REPORT OF THE DATA

The purpose of this study was to determine the feasibility of the media diagnostic test system proposed within this study. Specifically the study concerned itself with the ability of the system to: 1) produce learning style profiles in terms of ranked effectiveness of the media covered by a test; 2) function at different grade levels and with different media; 3) serve as a model, usable by classroom teachers in constructing tests for specific learning environments.

Data Collection

Based on the criteria described in chapter three the populations were selected, the tests developed and administered, and the data collected by the following procedures.

Populations

Since one of the questions to be answered as a result of this study was whether the media diagnostic test system proposed would function at different academic levels, two populations were selected solely on the bases of accessibility and difference in assigned academic level.

Test Population A was made up of 26 male university students ranging in academic level from freshman to senior. All the students in test population A were full time industrial arts students enrolled at Appalachian State University. At the time of the test each of the students was also enrolled in Industrial Arts 301, Introduction to Metals.

Test population B was made up of 27 sixth grade students from Appalachian Elementary School. This population consisted of twelve female and fifteen male students.

None of the students in either population A or B had any recorded physical or mental handicaps which might have affected the development of the tests or the results obtained.

Procedure

Based on the system described in chapter three, separate tests were developed for populations A and B. The purpose of developing two separate tests was to determine whether the system would demonstrate the capacity for functioning at different academic levels and with different media forms in accordance with the prescribed validation criteria. The only specific variations which occurred in the development of the two tests were the items of information introduced in the determinator phase of the system.

In the case of test population A, the university students, it was assumed that they could all function within reading and vocabulary level expectations of beginning thirteenth year students. This assumption was based on test information supplied from the University Testing and Psychological Services office. The media forms to be included in this test were arbitrarily selected. The forms used were text in the presentation mode, slide/audio tape in the presentation mode, and audio tape in the presentation mode.

As for population B, the sixth grade students, it was determined that the reading range (combined vocabulary and comprehension) was between middle third and beginning twelfth levels. This was derived from their standardized reading (comprehension and vocabulary) test scores and through further discussion with their teacher. Since the low end of the range was the only factor of concern according to the system, the test developed for population B was written so that students at the low end of the range should not have difficulty with the vocabulary or sentence structure. As a specific cross-check for this minimal reading level, each of the teaching sequences and test items used in the test administered to population B was reviewed by the population's teacher, with revisions in vocabulary and sentence structure being made upon her recommendations. The media forms which were used with test population B were, as with population A, selected arbitrarily. According to their teacher, the students had previously experienced each of the forms used. The forms selected were text in the presentation mode, text in the programmed instruction mode, and audio tape in the presentation mode.

Each test was made up of a teaching sequence and corresponding test items for each media form covered. Also, a single validation teaching sequence with corresponding test items was translated into each of the media forms. The test items used for each teaching sequence were identical in format to those used in the other teaching sequences. Variations occurred only in the specific data presented in a particular teaching sequence.

All cross-checks prescribed by the system were used to assure equality of teaching sequences and test items. In addition to the procedures outlined in the system for maintaining equality, another cross-check was used. Carol A. Rapp reviewed all materials for consistency and equality. Henrietta Nabors reviewed the materials for population B. These two individuals were selected for this review based on their background in communication arts and/or specific knowledge of the test population.

Media production techniques and equipment used in this study were kept at a level commensurate with techniques and equipment introduced in Introduction to Educational Media and Production of Educational Media, two basic media courses offered at the University of Northern Colorado. Similar basic educational media courses are available in most teacher training institutions. Therefore the writer assumed that teachers would have the potential for acquiring the skills necessary to produce basic media forms. The previously stated limitation on media production was applied in this study in order to keep such production within the potential of the classroom teacher.

See appendices A and B for teaching sequence text, test items, and answer keys. Appendix A covers the materials used in the test given to population A and appendix B covers the materials used in the test given to population B.

Administration of the tests to population A and B occurred in group settings. In the case of both populations, each teaching sequence was presented to the group followed immediately by the test items corresponding to the teaching sequence. In the cases where it was appropriate and feasible, individual materials were used. These individual materials were text teaching sequences in the presentation and programmed instruction modes and test items.

Testing for both populations was so arranged that the main phase of the test and the validation phase occurred at the same hour and under the same conditions on two separate days. In the case of both populations, one day was allowed to elapse between the administration of the main test and the administration of the validation phase. All test items and directions for taking the test were given in the text format.

With population A, all teaching sequences were in the presentation mode. Six and one half minutes were allowed for the text teaching sequence. The time required for the slide/audio tape and audio tape sequences were fixed by the nature of the media themselves, in this case, six and one half minutes. With this group, the nature of the media forms used to present the teaching sequences allowed for equal administration time. Seven minutes were allowed for the testing phase corresponding to each teaching sequence. With population B the time for each teaching sequence was varied according to the media form used. Seven minutes were allowed for the text, presentation mode; ten minutes for the text, programmed instruction mode; and five minutes for the audio tape, presentation mode. Seven minutes was allowed for the testing phase which occurred after each teaching sequence. The reason for the variation in time used with population B was that the nature of the media forms dictated differences in administration time.

Since the students of population A were available only during three different time blocks on alternate days, the test was administered to this population in three small group settings. The presentation order of the teaching sequences differed in one of the small groups. The purpose of this variation was to see whether the test results would show evidence of presentation order affecting scores achieved for each of the sequences included in the test.

Test scoring

Scoring, as suggested in chapter three, was accomplished by adding the point value assigned to each test item in order to get an accumulative score for each media form covered by the media diagnostic test. The point value assigned to a specific question was based on its order of difficulty according to learning levels in the cognitive domain. Specifically, the first three questions of each test of a teaching sequence were designed to measure the knowledge level. Each question on the knowledge level was assigned a one point value. Questions four and five were used to measure the comprehension level and each was assigned a two point value. Questions six and seven were used to measure the application level and each was assigned a point value of three. Questions eight and nine were used to measure the analysis level and were assigned a point value of four each. Thus the total points available for the nine questions accompanying each of the teaching sequences was twenty-one points.

Following the administration of the main pahse of the test (the testing of the three media forms) all tests were scored and the accumulative score for each media form was recorded (see Tables 1 and 2). Based on the accumulative score profile for each student, it was determined which of the three media forms should be most effective for that student. Each student was then retested using the validation teaching sequence in the media form which appeared to be most effective for him according to the before mentioned profile. In cases where a student scored equally well on two or more of the teaching sequences, the validation media form was arbitrarily selected from those forms having the highest scores.

The validation teaching sequence test items were scored by using the identical point system employed in the main phase. Each validation score was then recorded on the accumulative score profile sheet (see Tables 1 and 2).

Data Report

The data resulting from the tests which were developed and used in this study is presented in the form of

TABLE 1

MEDIA PROFILES FOR UNIVERSITY TEST POPULATION

Student Code	Validation	Text	Audio Tape	Slide/Audio Tape
1	9	9	8	10
2	11	10	8	11
3	13	14	7	13
4	10	9	11	2
5	12	13	12	11
6	20	20	7	13
7	18	19	7	11
8	11	8	10	11
9	14	7	1	12
10	14	14	12	13
11	15	12	14	14
12	13	7	9	10
13	11	6	11	8
14	16	15	5	8
15	14	7	15	8
16	15	8	13	14
17	9	8	10	9
18	9	8	6	8
19	11	10	10	10
20	11	12	12	12
21	11	11	7	7
22	10	4	9	10
23	17	17	14	14
24	13	12	5	7
25	17	12	14	21
26	16	4	9	19

Correlation between validation scores and underlined scores is +0.92.

TABLE 2

MEDIA PROFILES FOR SIXTH GRADE TEST POPULATION

Student Code	Validation	Text	Audio Tape	Programmed Text
M1	18	13	13	18
M2	13	7	13	7
M3	5	4	5	5
M4	21	13	8	21
M5	12	12	4	12
M6	15	14	13	19
M7	19	12	11	12
M8	12	11	7	13
M9	15	6	8	15
M10	15	18	14	18
M11	17	14	7	19
M12	13	13	15	13
M13	16	16	7	14
M14	9	9	8	5
M15	21	21	12	17
F1	17	13	10	18
F2	18	14	11	17
F3	10	6	11	9
F4	21	3	5	21
F5	10	8	10	3
F6	18	16	8	15
F7	17	16	3	17
F8	20	8	8	18
F9	15	12	8	17
F10	21	13	12	21
F11	12	5	8	12
F12	12	6	3	8

Correlation between validation scores and underlined scores is +0.88.

tables showing individual student profiles according to their accumulative scores for each media form (see Tables 1 and 2). One table is used per test population to provide a rapid visualization of the effectiveness of each media form on an individual student basis. These tables also allow a cursory comparison between the high scoring media and the validation score.

Those scores which have been underlined on the two tables represent the media form in which the validation sequence was presented.

At the end of each table the Pearson Product-Moment Correlation figure which resulted from the correlation of the highest scores on the main phase and the validation phase scores is shown. This correlation figure is meant to provide an indication of validity of the test given and, subsequently, the validity of the proposed system.

Findings

The following are findings based on the data collected from the tests which were developed and given as part of this study.

1. For test population A the Pearson Product-Moment correlation between the highest scores on the main phase of the test and the validation phase scores was +0.92.

2. For test population B the Pearson Product-Moment correlation between the highest scores on the main phase of the test and the validation phase scores was +0.88.

3. Thirteen of the twenty-six students making up population A achieved their highest score on the slide/audio tape form of the test.

4. Seven of the twenty-six students making up population A achieved their highest score on the audio tape form of the test.

5. Twelve of the twenty-six students making up population A achieved their highest score on the text form of the test.

6. Four of the twenty-six students making up population A achieved an equally high score on two or more media forms.

7. Fourteen of the twenty-six students making up test population A had a difference of only one point or less between their highest score and their next highest score.

8. Nineteen of the twenty-seven students making up population B achieved their highest score on the programmed instruction form of the test.

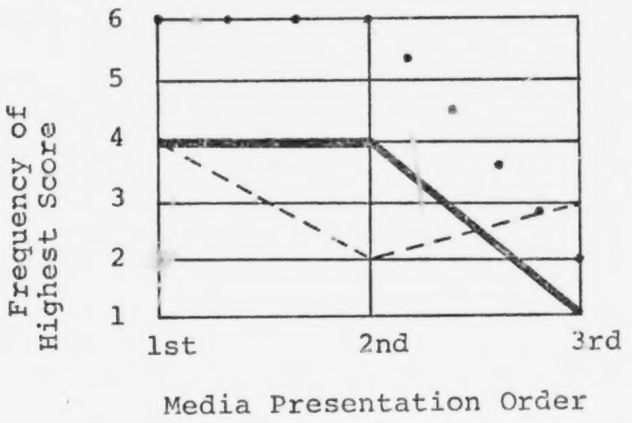
9. Five of the twenty-seven students making up population B achieved their highest score on the audio tape form of the test.

10. Seven of the twenty-seven students making up population B achieved their highest score on the text form of the test.

11. Four of the twenty-seven students making up population B achieved an equally high score on two or more media forms.

12. Seven of the twenty-seven students making up population B had a difference of only one point or less between their highest score and their next highest score.

13. Based on the data available, neither a relationship nor a lack of relationship was apparent between the media form having the highest score per individual and the order in which the media forms were presented (see Figure 15).



ADMINISTRATIVE SEQUENCE

Group 1 ————	Group 2 - - - - - -	Group 3 . . . . . .
1st - slide/tape	1st - slide/tape	1st - audio tape
2nd - text	2nd - text	2nd - text
3rd - audio tape	3rd - audio tape	3rd - slide/tape

Fig. 15.--This graph compares the highest scores achieved on the media forms covered by the test given to the university students when the administrative sequence was varied.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The purpose of this study was to determine whether the media diagnostic test system proposed within this study was a feasible model for predicting individual learning style profiles in terms of the ranked effectiveness of the media which were tested. More specifically the questions which were to be answered as a result of this study were:

1. Can the media diagnostic test system proposed in this study predict learning style profiles of individuals in terms of the media type covered by the test?
2. Can the media diagnostic test system proposed in this study be reapplied to construct new tests for other media forms and other grade levels?
3. Can the media diagnostic test system serve as a model which the classroom teacher can utilize in developing a test or tests for his or her classroom use, within the production limitations of the average classroom?

Population.--In this study two distinct populations were selected in order to derive the data necessary to answer the preceding questions. These two populations were: 1) twenty-six male university students ranging in academic level from freshman to senior, and 2) twenty-seven sixth grade students. This sixth grade population was composed of twelve female and fifteen male students.

Procedure.--With strict adherence to the steps specified by the proposed system, and as described in chapter three, two distinct tests were developed. Each of the tests was geared to one of the two test populations. The basic variations which occurred in the two tests were introduced into the system during the determinator phase. These variations were in the reading level (vocabulary and comprehension) and in the different media forms used in the two tests.

Each test contained a main phase having three specific teaching sequences, one for each of the media forms covered by the test, and a corresponding set of nine test items for each of the three teaching sequences. Each test also contained a validation phase which was composed of one teaching sequence which was translated into each of the three media forms covered by the test. The validation phase also had a set of nine test items which corresponded to the teaching sequence.

The completed tests were administered to the respective test populations for which they were designed. Both tests were administered in group settings, however, the settings varied in that the university student population was broken into three small groups, each group taking the test at a different time. With the sixth grade population, all the students were tested simultaneously. The administration also varied in the time allotted for the teaching sequences. For the university students each instructional sequence was equal in administration time. For the sixth grade students slightly different amounts of time were used for each of the instructional sequences.

All tests were scored and individual media effectiveness profiles were generated. Based on the information derived from these profiles, each student was retested in the validation phase. In this retesting, each student was given the validation phase test (a single teaching sequence and set of test items) in the media form which his main phase profile indicated as being most effective for him. These validation tests were then scored in the same manner as the main phase test and the results were recorded.

Finally a correlation was run between the students' highest scores on the main phase and their corresponding validation phase scores. This correlation was run for each of the two test populations, thus permitting comparison of the tests and determination of the system's ability to function at different levels and with different media.

Findings, Conclusions, and Recommendations

As a result of this study and the data obtained from it, the writer wishes to present the following findings, conclusions, and recommendations.

1. Finding.--The correlation between the main phase of the tests and the corresponding validation phase was +.92 for the university students and +.88 for the sixth grade students.
   Conclusion.--Both of these correlation figures far exceed the correlation figure necessary at the .05 and .10 levels of significance and both correlation figures exceed the correlation requirement of +.70 established in chapter three. Therefore, the writer concludes that the hypotheses as presented in Chapter I are valid, that is: 1) the system is a feasible model capable of predicting individual learning style profiles in terms of the ranked effectiveness of the media covered by the test, and 2) that the media diagnostic test system can be reapplied to construct new tests for other media forms and other academic levels which are equal (having met the minimum correlation

requirement) in their effectiveness for providing individual student media learning style profiles.

Recommendations.--Even though the correlation figure presents strong evidence that the system is a feasible model, the writer recommends that additional tests be developed, using the system as presented in this study, in order to substantiate or refute the conclusion that the system is a feasible model. Further, it is recommended that this additional testing of the system be done at different academic levels and with media forms different from those used in this study. Such testing might provide some new insights into the application and improvement of the system.

2. Finding.--The distribution of most effective media among the university students was somewhat uniform, slide/audio tape and text having a slightly higher concentration of students than the audio tape form. On the other hand, the distribution of most effective media was heavily concentrated in the programmed instruction media form with the sixth grade students.

Conclusions.--The order in which the teaching sequences were administered in the main phase of the test was varied with the university students and the programmed instruction form was the first teaching sequence to be administered to the sixth grade students. Since there was no evidence that a student's score improved as he progressed through the teaching sequences of the test, the writer concludes that each teaching sequence remains equally valid as a diagnostic element regardless of its position in the administrative sequence. In other words, the order of teaching sequence administration seems to have no observable effect on the results.

The heavy concnetration of scores noted for the sixth grade population suggests that programmed instruction might be the most effective mode of instruction for this level with this particular group of individuals.

Recommendations.--It is recommended that additional testing be done in which the order of administrative sequence is varied. This should help to further support or reject the writer's conclusion that the order of teaching sequence administration has no effect on the test results.

Due to the concentration of most effective scores noted in the sixth grade population, it is recommended that additional tests be developed using specific media in both the programmed instruction mode and the presentation mode. This might provide some comparison between the effectiveness of the two modes.

3. Finding.--In the total population of 53 students used for this study, twenty-one or approximately 40 percent had a difference of only one point or less between their highest score and their next highest score.

Conclusion.--Since such a high percentage of scores were this close, the writer believes one of the following to be true. Either the tests used did not develop sufficient discrimination or, for many individuals there is very little difference between effectiveness of some media forms.

Recommendation.--It is the opinion of this writer that further tests should be developed, according to the system, with a greater emphasis placed on the test item development. The use of more test items may increase the test discrimination, or on the other hand, it may further support the possibility that for some individuals there is very little difference between effectiveness of some media forms.

4. Finding.--Through the utilization of basic media production equipment and techniques it was possible to produce all of the media necessary for the two tests used in this study.

Conclusion.--The writer feels that a teacher who has taken one or two basic educational media courses would have the background necessary to produce a media diagnostic test which utilizes basic media forms.

Recommendation.--It is recommended that a study be conducted to determine whether some media forms might be interchangeable in their validity. (Example: sound movie and video tape using the same style and techniques.) Such a study might provide evidence which would allow the substitution of basic and easily produced media forms for more sophisticated and hard to produce media forms.

Summary

In summarizing, it is perhaps most appropriate to examine the three questions which were presented in the original statement of the problem.

First, can the media diagnostic test system proposed in this study predict learning style profiles of individuals in terms of the media forms covered by the test? Based on the evidence which has been presented in chapters four and five of this study, the writer feels that the answer to this question is a qualified yes. The qualification arises from the fact that the experimental information is limited and is possibly subject to change or modification based on additional evidence.

Second, can the media diagnostic test system proposed in this study be reapplied to construct new tests for other media types and other grade levels? Again, in the writer's opinion, and based on the evidence resulting from this study, the answer to this question is a qualified yes. Since the system was used to develop two tests for different academic levels, and since these two tests did differ in at least one media form, the conclusion which can be reached is that the system does work for different levels and different media forms. Again, the yes must be qualified to the extent that the evidence resulting from this study is limited and, as the result of further investigation, might be subject to change or modification.

Third, can the media diagnostic test system serve as a model which the classroom teacher can utilize in developing a test for his or her classroom use, within the production limitations of the average school?

In the writer's opinion, the answer to this question is two-fold. In the strictest sense, the evidence indicates that the system would serve the classroom teacher as a model for producing similar tests for his or her own use. Also, the writer feels that the media production requirements are within the capability of the classroom teacher. However, having produced two tests in accordance with the system, this writer feels that the time and effort involved in construction of the test is probably beyond that which most teachers would be willing to expend. On the other hand, the writer feels that the system does offer a great potential in its use for developing standardized tests, which in turn could be applied by the classroom teacher for the improvement of his or her instruction.

Recommendations for Further Study

The following are further avenues of investigation which have suggested themselves to the writer as he has conducted this study.

1. The system as proposed in this study should be retested for the psychomotor and affective domains in order to determine how the system functions in these areas.
2. It is recommended that additional experimentation be conducted in the pattern of this study with a time lapse between instruction and testing in order to determine retention effectiveness of the various media forms.
3. It is recommended that additional experimentation be conducted in the pattern of this study to determine the effect of time and experience on the validity of an individual profile.
4. It is recommended that additional experimentation be conducted in the pattern of this study to determine whether or not there is a discernable difference between the results of group administered as opposed to individually administered tests.
5. It is recommended that additional experimentation be conducted in the pattern of this study to find out what effect instruction and/or practice in the use of a particular media form might have on the resultant profile of individual students.

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APPENDICES

APPENDIX A

Test Elements Used with the University Student Population

Content Page

Main Phase

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MEDIA TEST SEGMENT

Slide/Audio Tape Presentation

SLIDE	TEXT
1. Media Test Segment Slide/Audio Tape Presentation	Welcome to the slide/tape segment of this media evaluation device. The first thing
2. Picture of test folder and pencil	I want you to do is to check and see if you have a pencil and a folder like the one on the screen. Don't open it! If for any reason you do not have these two items, tell your instructor right now. If at anytime during this evaluation the tape or slides do not function properly, tell your instructor immediately.
3. Media Test Segments	This media test segment is divided into three parts.
4. Media Test Segments 1. Objectives	First, I am going to tell you what I want you to be able to

	do at the end of the presentation.
5. Media Test Segments 1. Objectives 2. Presentation	Second, there will be a presentation on a subject completely new to you.
6. Media Test Segments 1. Objectives 2. Presentation 3. Questions	Third, in the folder there are a series of questions which you will be asked to answer as best you can within the time given.
7. Objectives	Let's start. The objectives are as follows:
8. Objectives 1. Recall	After you have viewed the slide/tape presentation, you will be asked to recall terms, facts, methods, and theories given in the presentation.
9. Objectives 1. Recall 2. Identify	You will be asked to identify statements as correct or incorrect based on the presentation.
10. Objectives 1. Recall 2. Identify	You will be asked to apply to new situations, the rules,

	principles, or theories presented.
11. Objectives 1. Recall 2. Identify 3. Apply 4. Analyze	You will be asked to analyze statements and determine whether they are true, based on the information presented.
12. The Beginning Picture of trumpets	Now get comfortable, for the presentation is about to begin.
13. Treeology	The study of Treeology is essential for the people of Tall Oak,
14. Island surrounded with water	an island which is located in the South Atlantic Ocean.
15. Close-up of tropical fruit	Based on the science of Treeology, the people of Tall Oak have been able to develop some of the most unusual and desirable fruit in the entire world,
16. Fruit tree groves	thus maintaining a thriving agricultural economy.
17. People picking fruit	Since all the people of Tall Oak are engaged in the

	production of these unusual fruits,
18. Children in classroom	the study of Treeology has become a basic subject in the government established curriculum which is studied by all children, under twelve, living on Tall Oak.
19. Pictorial diagram showing that fruit from an apple and pear tree planted next to each other is in accord with the Treeology principle.	The principle of Treeology is: When two fruit bearing trees are planted in the proper relationship to each other and planted under the proper conditions, the fruit of each tree will exhibit 2/3 of the characteristics of the adjacent tree and 1/3 of its own characteristics.
20. Jungle scene	Unfortunately for the rest of the world, but fortunately for Tall Oak, the principle of Treeology only applies to the island of Tall Oak, where the botanical conditions are correct for this scientific

	phenomenon to take place.
21. Fruit being loaded on boats	The people of Tall Oak have used this principle to develop their only export. However, in order to assure themselves of the desired product, it is necessary that the following rules be observed.
22. Two trees in north south relationship	The first rule is that all trees must be planted in a north-south relationship.
23. Pear tree located north of an apple tree	This north-south relationship must be arranged so that the tree with the first letters of its common name closest to the beginning of the alphabet will always be south of the other tree.
24. Pear and peach tree planted in a north-south relationship (note indicating that no fruit will grow)	Also, no two trees having the same first letter can be planted next to each other in this north-south relationship and bear fruit.

25. Two trees of slightly different size - (note indicating between five and seven years)	The second rule is that trees which are to be planted for the purpose of producing the unusual Tall Oakean fruit must be between the ages of five and seven years old at the time of planting.
26. Two trees, one of which is dead. A note indicating that the dead tree was disturbed.	If the trees are disturbed once this planting has taken place, the tree closest to the south will always die.
27. Calendar with arrow pointing to the first day after the full moon	The last rule states that all trees which are to exhibit the results of the Treeology principle must be planted on the first day after a full moon.
28. Sun setting over island	Since the climate for growing is suitable all year around on Tall Oak, this planting can occur after any new moon.
29. Writing name on test booklet.	Open your test folder now and write your name in the space provided on the front of the test booklet.

30. Opening the test booklet	In a moment you will be asked to turn the page and begin the test. You will be given seven minutes to complete your work. Be sure to read the directions carefully before you start. Now, turn the page and begin.
31. Blank slide	(Seven minutes of silence)
32. Stop	Stop! Close your test booklet and give it to your instructor.

TEST ITEMS

Each of the following test items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully, then select the most appropriate choice to complete the statement or answer the question. Only one answer is correct for each item. Place the letter found in front of the choice you have made in the circle provided at the lower right hand corner of each page. Answer each question in turn and do not turn back to any question you have already read or answered.

1. The name of the science described in the materials just presented was ________________.

    A) Flowerology

    B) Roadology

    C) Treeology

    D) Fruitology

    E) None of the above

2. The science described in the presentation was developed in the country of _____________.

    A) Tall Island

    B) Tall Oak

C) Small Oak

D) Small Island

E) None of the above

3. The practice of this science is essential to the country's ______________.

A) tourist economy

B) industrial economy

C) agricultural economy

D) educational program

E) none of the above

4. Which of the following statements is not a rule covering the application of the science described in the presentation?

A) Trees must be planted in a north-south relationship to bear the special fruit.

B) Trees must be planted between the ages of 5 and 7 years to bear the special fruit.

C) The tree whose common name begins with the letter closest to the beginning of the alphabet must be planted closest to the south.

D) For the trees to bear the special fruit they must be planted one day before the new moon.

E) None of the above

5. Which of the following statements best describes the country in the presentation?

A) the country is landlocked in the south of Africa

B) the country is an island in the North Atlantic

C) the country is an island in the South Atlantic

D) the country is a coastal country facing the South Atlantic

E) none of the above

6. If the proper conditions are observed, and the principle described in the presentation is applied, the product of an apple tree and pear tree would be:

A) 2/3 apple and 1/3 pear on the apple tree.

B) 1/2 apple and 1/2 pear on the pear tree.

C) 2/3 apple and 1/3 pear on the pear tree and 1/3 apple and 2/3 pear on the apple tree.

D) 2/3 apple and 1/3 pear on the pear tree and 2/3 apple and 1/3 pear on the apple tree.

E) none of the above.

7. If the proper conditions are observed, and the principle described in the presentation is applied, the product of a peach tree and a pear tree would be:

A) 1/3 peach and 2/3 pear on the peach tree.

B) 1/2 peach and 1/2 pear on the pear tree.

C) 2/3 peach and 1/3 pear on the pear tree and 1/3 peach and 2/3 pear on the peach tree.

D) 2/3 peach and 1/3 pear on the peach tree and 2/3 pear and 1/3 peach on the pear tree.

E) none of the above.

8. Based on the presentation, which of the following is most likely to be true?

   A) Trees which are planted after the age of 7 years will probably die.

   B) A tree which is planted on a day other than the first day before the full moon will not bear fruit.

   C) If a pear and a peach tree are planted in a north-south relationship, the pear tree will probably not bear fruit.

   D) Two trees must be planted in a north-south relationship if they are to bear any fruit.

   E) None of the above

9. Based on the presentation, which of the following is least likely to be true?

   A) The development of a good railway system in the country described in the presentation would improve the movement of the fruit to other countries.

   B) The growing of trees in an east-west direction will have no special effect on the fruit borne by the trees.

   C) If there are twelve new moons each year, the maximum number of days available for planting according to the principle and rules described would be 12.

D) When seeds of two trees are planted in the proper relationship to each other and on the correct day, they will not result in trees that bear the special fruit.

E) None of the above

Answer Key - Treeology

Question	1	2	3	4	5	6	7	8	9
Answer	C	B	C	D	C	C	E	C	A
Point Value	1	1	1	2	2	3	3	4	4

MEDIA TEST SEGMENT

Audio Tape Presentation

SCRIPT

Welcome to the audio tape segment of this media evaluation device. The first thing I want you to do is check and see if you have a pencil and a test folder. Please don't open it. If for any reason you do not have these two items, tell your instructor right now. If at any time during the rest of this presentation the tape should not function properly, tell your instructor immediately.

Let's see what's going to happen in this program.

First, I'm going to tell you what I want you to be able to do at the end of the presentation.

Second, there will be a presentation on a subject completely new to you.

Third, in the folder there are a series of questions which you will be asked to answer as best you can within the time given.

Now let's begin by considering the objectives:

After you have listened to the audio tape presentation, you will be asked to recall terms, facts, methods, and theories given in the presentation.

You will be asked to identify statements as correct or incorrect based on the presentation.

You will be asked to apply to new situations, the rules, principles, or theories presented.

You will be asked to analyze statements and determine whether they are true, based on the information presented.

Keep these objectives in mind as you listen to the following presentation on the science of Roadology.

Roadology is the name given to the sophisticated transportation system developed in the East Asian Country of Rexan.

The people of Rexan have been able to maintain one of the most lucrative tourism economies in the entire world, based on the curious interest of outsiders in their science of Roadology.

Because more than fifty percent of the adults over the age of twenty-one are involved in some phase of the tourism industry, the study of Roadology is a required course for all high school students who are resident citizens of Rexan.

The principle of Roadology is: when thermomagnetic power sources are used in Rexanian transportation vehicles, all such vehicles will always remain 100 feet behind any other vehicles and ten feet away from any other object to its side, if they are operated within the proper rules.

Unfortunately for the rest of the world the principle of the thermo-magnetic power source has been kept a closely guarded secret in the land-locked country of Rexan, where it was developed: thus making Roadology an ideal tourist attraction.

For residents and tourists of Rexan to use the principle of Roadology, and thus promote the main industry of tourism, the following rules must be closely observed.

The first rule is that non-thermo-magnetic powered vehicles must remain in those lanes of the road which are colored red.

By restricting non-thermo-magnetic vehicles to their red lanes, there is no chance of a non-thermo-magnetic powered vehicle running into a thermo-magnetic vehicle ahead of it.

Also, thermo-magnetic vehicles are restricted from operating in the red lanes because statistics show a 99 per cent chance that an accident will happen if they are driven in the red lanes.

The second rule is that all operators of thermo-magnetic vehicles must be over the age of thirty. If the operator is under thirty years old, the radiation from the power source causes a rapid aging process which will terminate in death within twenty-four hours.

The third and last rule states that all thermomagnetic vehicles must be operated after sunrise and before sunset for the principle of Roadology to hold true. The geographical location of the country is ideal for the use of this principle, since there is a period of only four hours each day when the sun does not shine on this lovely country.

Open your folder now and write your name in the space provided on the front of the test booklet. (pause 10 seconds)

In a moment you will be asked to turn the page and begin the test. You will be given seven minutes to complete your work. Be sure to read the directions carefully before you start. Now turn the page and begin. (Silence for seven minutes)

Stop! Close your test booklet and give it to your instructor.

TEST ITEMS

Each of the following test items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully, then select the most appropriate choice to complete the statement or answer the question. Only one answer is correct for each item. Place the letter found in front of the choice you have made in the circle provided at the lower right hand corner of each page. Answer each question in turn and do not turn back to any question you have already read or answered.

1. The name of the science described in the materials just presented was_______________.

   A) Flowerology

   B) Transportationology

   C) Carology

   D) Metalology

   E) None of the above

2. The science described in the presentation was developed in the country of______________.

   A) Reo

   B) Rattan

   C) Rexan

D) Runner

E) None of the above

3. The practice of this science is essential to the country's________________.

A) tourist economy

B) industrial economy

C) agricultural economy

D) educational program

E) none of the above

4. Which of the following statements is not a rule covering the application of the science described in the presentation?

A) Thermo-magnetic powered vehicles must remain in those lanes of the road which are not colored red.

B) Thermo-magnetic powered vehicles must be operated before sunset and after sunrise.

C) Non-thermo-magnetic powered vehicles are restricted to operating only in the red lanes of the road.

D) Operators of thermo-magnetic vehicles must be under the age of thirty years to prevent radiation-caused aging.

E) None of the above

5. Which of the following statements best describes the country in the presentation?

A) The country is land-locked in West Asia.

B) The country is an island off the coast of East Asia.

C) The country is a coastal country in West Asia.

D) The country is a land-locked country in East Asia.

E) None of the above

6. If the proper conditions are observed, and the principle described in the presentation is applied, the result of a thermo-magnetic powered vehicle following a non-thermo-magnetic vehicle in the red lane would be ________________.

A) that of forcing the non-thermo-magnetic vehicle off the road.

B) an unavoidable accident.

C) a constant distance of 100 feet maintained between the two vehicles.

D) a rapid aging of the driver of the thermo-magnetic vehicle.

E) none of the above

7. If the proper conditions are observed, and the principle described in the presentation is applied, the result of a non-thermo-magnetic vehicle following a thermo-magnetic vehicle in a non-red lane would be

__________________.

A) the possibility of the non-thermo-magnetic vehicle running into the thermo-magnetic vehicle.

B) a distance of 10 feet being maintained between the vehicles.

C) a distance of 100 feet being maintained between the vehicles.

D) the possibility of the thermo-magnetic vehicle running into the non-thermo-magnetic vehicle.

E) none of the above

8. Based on the presentation, which of the following is least likely to be true?

A) Thermo-magnetic vehicle operation is 99 percent safer in the non-red lanes than it is in the red lanes.

B) If an individual is less than 30 years of age and operates a vehicle in the non-red lanes, he will experience rapid aging.

C) The single largest occupational area in the country described in the presentation is the tourist industry.

D) In order to be able to drive at any time, day or night, a resident should own a non-thermo-magnetic vehicle.

E) None of the above

9. Based on the presentation, which of the following is most likely to be true?

A) Thermo-magnetic vehicles are safer operating in the red lanes than non-thermo-magnetic vehicles operated in lanes which are not red.

B) A thermo-magnetic vehicle operating in its proper lane and traveling at a rate of 60 miles per hour will cause any other vehicle in front of it to also travel at 60 miles per hour.

C) A thermo-magnetic vehicle operated by a driver under 30 years, after sunset, has a 99 per cent chance of being involved in an accident.

D) A non-thermo-magnetic vehicle which is operated by a driver under the age of 30 years, in a lane other than a red lane, will suffer from a rapid aging process and die within 24 hours.

E) None of the above

Answer Key - Roadology

Question	1	2	3	4	5	6	7	8	9
Answer	E	C	A	D	D	C	A	B	B
Point Value	1	1	1	2	2	3	3	4	4

124

MEDIA TEST SEGMENT

Text Presentation

TEXT

This is the text segment of the media evaluation device. Before you read any farther check and see that you have a pencil and a folder marked TEST. Please do not open the folder. If for any reason you do not have either of these two items tell your instructor right now. If you do have these two items continue reading.

Introduction

This test segment has three parts.

First, you will be told what will be expected of you when you have finished reading the story given in this segment.

Second, you will read the story.

Third, you will answer a series of questions about the material presented in the story. These questions are in the test folder.

Now turn the page.

First - What will be expected of you.

After you have read the story in this segment of the test, you will be asked to recall terms, facts, methods and theories given in the story.

You will be asked to apply to new situations, the rules, principles, or theories presented in the story.

You will be asked to analyze statements and determine whether they are true, based on the information presented in the story.

Now with these objectives in mind, turn the page and read the story.

FLOWEROLOGY

The application of Flowerology is an essential aspect of the industrial economy of the North European country of Nap. It is based on the application of the science of Flowerology that the country of Nap has been able to become the leader in pure metal refinement.

Since metal refinement is the major industry in this coastal country, all boys over the age of twelve are required by law to take a special four year program in Flowerology. However, because all the people of Nap have a basic interest in Flowerology, many girls also elect to participate in the program.

The principle of Flowerology is: When moneyweed is planted under the proper conditions and in a soil of a specific metallic ore, the seed pods of this plant will yield seeds of that chemically pure metal.

Because of the biological uniqueness of the moneyweed plant, the application of this scientific phenomenon can take place only in a specific one hundred square mile area of Nap. Unfortunately for others the special conditions which exist in this limited area of Nap do not exist anywhere else, thus preventing the application of Flowerology in the rest of the world.

It is the result of the Flowerology principle that has made the country of Nap the leader in the pure metal production throughout the world. However, in order to produce these pure metals, the grower of metal producing moneyweed must observe the following rules in order to apply the principle of Flowerology.

The first rule is that any moneyweed plant which is to bear pure metal seeds must be planted in a soil base of metallic ore. The metallic ore must have a minimum of 5 per cent of the metal desired and can not contain any other metal in a higher percentage than 2 per cent if it is to produce the pure metal desired.

It has been found that when two or more metals are present in the ore in an excess of 2 per cent, the product is seeds of unpredictable alloys.

The second rule is that the moneyweed plant which is to produce the metal seeds must be transplanted into soil of metallic ore when it is a seedling of between 8 and

10 weeks. If it is transplanted before the eighth week or after the tenth week, the seeds will show no metallic characteristics.

The third and last rule states that all moneyweed transplanting for the purpose of producing metal seeds must occur in the afternoon on days when at least one inch of rain has fallen. Because of the high rain fall in the country of Nap, statistics show that at least 250 days will be available for planting each year.

STOP - - - TURN THE PAGE AND READ THE DIRECTIONS

Now that you have finished reading the story please close this booklet, turn it face down, and sit quietly until you are directed to open the test folder.

TEST ITEMS

Each of the following test items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully, then select the most appropriate choice to complete the statement or answer the question. Only one answer is correct for each item. Place the letter found in front of the choice you have made in the circle provided at the lower right hand corner of each page. Answer each question in turn and do not turn back to any question you have already read or answered.

1. The name of the science described in the material just presented was________________.
    A) Plantology
    B) Flowerology
    C) Treeology
    D) Metalology
    E) None of the above
2. The science described in the presentation was developed in the country of______________.
    A) Sap
    B) Lap

C) Nap

D) Nate

E) None of the above

3. The practice of the science described in the presentation is essential to the country's______________.

A) Agricultural Economy

B) Industrial Economy

C) Manufacturing Economy

D) Tourist Economy

E) None of the above

4. Which of the following is not a rule covering the application of the science described in the presentation?

A) In order to bear pure metal seeds, moneyweed must be planted in a soil base of metallic ore.

B) Moneyweed seedlings used to produce metallic seeds need to be transplanted between the 8th and 10th week of their growth.

C) Moneyweed seedlings must be transplanted on days when one inch of rain has fallen.

D) The metallic soil base used to grow moneyweed can not contain equal percentages of 2 or more metals and produce the pure metal seeds.

E) None of the above

5. Which of the following terms best describes the country in the presentation?
   - A) Island in the North Atlantic Sea
   - B) Mountain in north Europe
   - C) North European coastal country
   - D) Land locked in north Asia
   - E) None of the above

6. If the proper conditions are observed, and the principle described in the presentation is applied, the product of moneyweed grown in soil containing 5% iron and 3% nickel would be:
   - A) A 95% iron 3% nickel alloy
   - B) a 80% iron 20% nickel alloy
   - C) Pure iron
   - D) 62.5% iron 37.5% nickel alloy
   - D) None of the above

7. If the proper conditions are observed, and the principle described in the presentation is applied, the result of growing moneyweed in a soil containing 4% iron and no other metallic element would be:
   - A) pure iron
   - B) seeds of an unknown alloy
   - C) iron alloy seeds
   - D) plain moneyweed seeds
   - E) none of the above

8. Based on the presentation, which of the following is least likely to be true?

   A) If you are a boy living in the country described in the presentation, you will study the science described in the presentation.

   B) The scientific phenomenon described in the presentation is limited to a specific area in the country described in the presentation.

   C) Metallic soil imported from any other country may not be used for the growing of metal producing moneyweeds.

   D) It would be difficult to engage in activities which required extended periods (weeks) of dry weather in the country described in the presentation.

   E) All of the above are likely to be true.

9. Based on the presentation, which of the following is most likely to be true?

   A) More than 50% of the male population of the country described in the presentation works in the production of pure metal moneyweed seeds.

   B) Pure metals are only produced in the country described in the presentation.

   C) By carefully controlling the metallic content of the soil base used to grow moneyweed, it is possible to grow known alloy seeds.

D) The growing of moneyweed is best described as a full time occupation, rather than a seasonal occupation.

E) None of the above is likely to be true.

Answer Key - Flowerology

Question	1	2	3	4	5	6	7	8	9
Answer	B	C	B	D	C	E	D	C	D
Point Value	1	1	1	2	2	3	3	4	4

MEDIA TEST SEGMENT

Slide/Audio Tape Presentation

SLIDE	TEXT
1. Media Test Segment Slide/Audio Tape Presentation	Welcome to the slide/tape segment of this media evaluation device.
2. Picture of test folder and pencil	The first thing I want you to do is to check and see if you have a pencil and a folder like the one on the screen. Don't open it! If for any reason you do not have these two items, tell your instructor right now. If at anytime during this evaluation the tape or slides do not function properly, tell your instructor immediately.
3. Media Test Segments	This media test segment is divided into three parts.
4. Media Test Segments 1. Objectives	First, I am going to tell you what I want you to be able to

	do at the end of the presentation.
5. Media Test Segments 1. Objectives 2. Presentation	Second, there will be a presentation on a subject completely new to you.
6. Media Test Segments 1. Objectives 2. Presentation 3. Questions	Third, in the folder there are a series of questions which you will be asked to answer as best you can within the time given.
7. Objectives	Let's start. The objectives are as follows:
8. Objectives 1. Recall	After you have viewed the slide/tape presentation, you will be asked to recall terms, facts, methods, and theories given in the presentation.
9. Objectives 1. Recall 2. Identify	You will be asked to identify statements as correct or incorrect based on the presentation.
10. Objectives 1. Recall 2. Identify 3. Apply	You will be asked to apply to new situations, the rules, principles, or theories presented.

11. Objectives 1. Recall 2. Identify 3. Apply 4. Analyze	You will be asked to analyze statements and determine whether they are true, based on the information presented.
12. The Beginning Picture of trumpets	Now get comfortable, for the presentation is about to begin.
13. Colorology	The implementation of the scientific phenomenon known as Colorology
14. Antarctic landscape	is essential to the textile centered economy of Soon, a small arid nation located in the antarctic.
15. Striped fabrics	It is based on the Colorology principle that the people of Soon have been able to produce the most economical and appealing line of striped fabrics found anywhere in the world.
16. Picture of a farm	Since the nation of Soon is still a rural country,
17. Family weaving	the study of the principle of

	Colorology and the manufacture of the unique Soon textile fabric is family centered, being passed on to all children by their parents.
18. Juices being mixed - striped fabric coming from solution	The principle of Colorology is: When juices of sickelberries are mixed in the proper proportions and under the proper conditions, the product will be a dye which is capable of permanently dying striped fabrics in a one step operation.
19. Mock-up of Soon newspaper Headline - Another good growing season	Because of the special climatic and atmospheric conditions required to grow the sickelberry bush, Soon is the only country in the world where it is economically feasible and profitable to grow this bush and apply the principle of Colorology.

20. Striped fabrics around globe	Thus it is that the people of Soon have managed to develop a major control over the striped fabric production of the world. However, in order to produce their unique fabrics, the people of Soon must observe the following rules when applying the principle of Colorology.
21. Pictorial diagram illustrating the principle of Colorology	The first rule is that the different colored sickelberry juices must be mixed in amounts proportionate to the width of the stripe desired and in alphabetical order, according to the first letters of their common name.
22. Pictorial diagram illustrating improper mixing resulting in a solid color	If the juices are mixed in reverse alphabetical order, the result will be a solid color equal to the color of the first juice.
23. Dye aging in open air - note indicating	The second rule is that the juice to be used in the dye

aging time of six to nine months	must have been aged in the open air for more than six months but less than nine months.
24. Fabric dissolving in dye - note indicating that the dye was aged less than six months or more than nine months	When the juices have not been aged the proper amount of time the result is a liquid that will dissolve any fabric which is placed in it.
25. Pictorial diagram showing juices being mixed at a temperature of 20 degrees Fahrenheit	The third and last rule is that sickelberry juices which are to be mixed in order to produce the unique striping dye must be mixed on days when the temperature does not rise above 20 degrees Fahrenheit.
26. Snow covered building 27. Calendar showing days which are too hot to plant	Since Soon has a frigid climate, there are fewer than thirty days each year when this mixing cannot take place.
28. Writing name on test booklet	Open your test folder now and write your name in the space

	provided on the front of the test booklet.
29. Opening the test booklet	In a moment you will be asked to turn the page and begin the test. You will be given seven minutes to complete your work. Be sure to read the directions carefully before you start. Now, turn the page and begin. (seven minutes of silence)
30. Stop	Stop! Close your test booklet and give it to your instructor.

MEDIA TEST SEGMENT

Audio Tape Presentation

SCRIPT

Welcome to the audio tape segment of this media evaluation device. The first thing I want you to do is to check and see if you have a pencil and a test folder. Please don't open it. If for any reason you do not have these two items, tell your instructor right now. If at any time during the rest of this presentation the tape should not function properly, tell your instructor immediately.

Let's see what's going to happen in this program.

First, I'm going to tell you what I want you to be able to do at the end of the presentation.

Second, there will be a presentation on a subject completely new to you.

Third, in the folder there are a series of questions which you will be asked to answer as best you can within the time given.

Now let's begin by considering the objectives.

After you have listened to the audio tape presentation, you will be asked to recall terms, facts, methods, and theories given in the presentation.

You will be asked to identify statements as correct or incorrect based on the presentation.

You will be asked to apply to new situations, the rules, principles, or theories presented.

You will be asked to analyze statements and determine whether they are true, based on the information presented.

Keep these objectives in mind as you listen to the following presentation on the science of Colorology.

The implementation of the scientific phenomenon known as Colorology is essential to the textile centered economy of Soon, a small arid nation located in the Antarctic. It is based on the Colorology principle that the people of Soon have been able to produce the most economical and appealing line of striped fabrics found anywhere in the world.

Since the nation of Soon is still a rural country, the study of the principle of Colorology and the manufacture of the unique Soon textile fabric is family centered, being passed on to all children by their parents.

The principle of Colorology is: When the juices of sickelberries are mixed in the proper proportions and under the proper conditions, the product will be a dye which is capable of permanently dying striped fabrics in a one step operation.

Because of the special climatic and atmospheric conditions required to grow the sickelberry bush, Soon is the only country in the world where it is economically feasible and profitable to grow this bush and apply the principle of Colorology.

Thus it is that the people of Soon have managed to develop a major control over the striped fabric production of the world. However, in order to produce their unique fabrics, the people of Soon must observe the following rules when applying the principle of Colorology.

The first rule is that the different colored sickelberry juices must be mixed in amounts proportionate to the width of the stripe desired and in alphabetical order, according to the first letter of their common name. If the juices are mixed in reverse alphabetical order the result will be a solid color equal to the color of the first juice.

The second rule is that the juices to be used in the dye must have been aged in the open air for more than six months but less than nine months. When the juices have not been aged the proper amount of time the result is a liquid that will dissolve any fabric which is placed in it.

The third and last rule is that sickelberry juices which are to be mixed in order to produce the unique striping dye must be mixed on days when the termperature does not rise above 20 degrees Fahrenheit. Since Soon has a frigid climate, there are fewer than 30 days each year when this mixing cannot take place.

Open your folder now and write your name in the space provided on the front of the test booklet. (pause 10 seconds)

In a moment you will be asked to turn the page and begin the test. You will be given seven minutes to complete your work. Be sure to read the directions carefully before you start. Now turn the page and begin. (Silence for seven minutes)

Stop! Close your test booklet and give it to your instructor.

MEDIA TEST SEGMENT

Text Presentation

TEXT

This is the text segment of the media evaluation device. Before you read any farther check and see that you have a pencil and a folder marked TEST. Please do not open the folder. If for any reason you do not have either of these two items tell your instructor right now. If you do have these two items continue reading.

Introduction

This test segment has three parts.

First, you will be told what will be expected of you when you have finished reading the story given in this segment.

Second, you will read the story.

Third, you will answer a series of questions about the material presented in the story. These questions are in the test folder.

Now turn the page.

First - What will be expected of you.

After you have read the story in this segment of the test, you will be asked to recall terms, facts, methods and theories given in the story.

You will be asked to apply to new situations, the rules, principles or theories presented in the story.

You will be asked to analyze statements and determine whether they are true, based on the information presented in the story.

Now with these objectives in mind, turn the page and read the story.

COLOROLOGY

The implementation of the scientific phenomenon known as Colorology is essential to the textile centered economy of Soon, a small arid nation located in the Antarctic. It is based on the Colorology principle that the people of Soon have been able to produce the most economical and appealing line of striped fabrics found anywhere in the world.

Since the nation of Soon is still a rural country, the study of the principle of Colorology and the manufacture of the unique Soon textile fabric is family centered, being passed on to all children by their parents.

The principle of Colorology is: When the juices of sickelberries are mixed in the proper proportions and under the proper conditions, the product will be a dye which is capable of permanently dying striped fabrics in a one step operation.

Because of the special climatic and atmospheric conditions required to grow the sickelberry bush, Soon is the only country in the world where it is economically feasible and profitable to grow this bush and apply the principle of Colorology.

Thus it is that the people of Soon have managed to develop a major control over the striped fabric production of the world. However, in order to produce their unique fabrics, the people of Soon must observe the following rules when applying the principle of Colorology.

The first rule is that the different colored sickelberry juices must be mixed in amounts proportionate to the width of the stripe desired and in alphabetical order, according to the first letter of their common name. If the juices are mixed in reverse alphabetical order the result will be a solid color equal to the color of the first juice.

The second rule is that the juices to be used in the dye must have been aged in the open air for more than six months but less than nine months. When the juices have not been aged the proper amount of time the result is a liquid that will dissolve any fabric which is placed in it.

The third and last rule is that sickelberry juices which are to be mixed in order to produce the unique striping dye must be mixed on days when the termperature does not rise above 20 degrees Fahrenheit. Since Soon has a frigid climate, there are fewer than 30 days each year when this mixing cannot take place.

STOP - - - TURN THE PAGE AND READ THE DIRECTIONS

Now that you have finished reading the story please close this booklet, turn it face down, and sit quietly until you are directed to open the test folder.

TEST ITEMS

Each of the following test items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully, then select the most appropriate choice to complete the statement or answer the question. Only one answer is correct for each item. Place the letter found in front of the choice you have made in the circle provided at the lower right hand corner of each page. Answer each question in turn and do not turn back to any question you have already read or answered.

1. The name of the science described in the material just presented was ________________.

   A) Berryology

   B) Bushology

   C) Colorology

   D) Dyeology

   E) None of the above

2. The science described in the presentation was developed in the country of ________________.

   A) Small

   B) Soon

   C) Sun

D) Sape

D) None of the above

3. The practice of the science covered in the presentation is essential to the country's________________.

A) tourist economy

B) industrial economy

C) manufacturing economy

D) agricultural economy

E) none of the above

4. Which of the following is not a rule covering the application of the science described in the presentation?

A) Sickelberry juices must be mixed in alphabetical order, according to the first letter of their common name.

B) Sickelberry juices to be used for the striping dye must be aged six to nine months before mixing.

C) Sickelberry juices must be mixed in the same proportions as those of the stripes desired.

D) Sickelberry juices must be at a temperature of less than 30 degrees Fahrenheit when they are mixed.

E) None of the above

5. Which of the following terms best describes the country in the presentation?

A) Industrialized

B) Tropical

C) Rural

D) Urban

E) None of the above

6. If the proper conditions are observed, and the principle described in the presentation is applied, the product of one part red sickelberry juice, two parts blue sickelberry juice, and three parts white sickelberry juice might be which of the following?

A) a one inch white stripe, a one-half inch blue stripe, and a one-quarter inch red stripe

B) a two inch blue stripe, a one inch red stripe, and a three inch white stripe

C) a one-half inch red stripe, a one inch blue stripe, and a one and one-half inch white stripe

D) a solid red would result

E) None of the above

7. If the proper conditions are observed, and the principle described in the presentation is applied, the result of mixing equal parts of black, blue, and brown juices, all of which have been aged 7 months would be which of the following?

A) a dye which produces a totally black fabric

B) a striped pattern of brown, blue, and black; all stripes being equal in width

C) a dye which will dissolve the fabric

D) a dye which produces black, blue, and brown stripes of varying widths

E) none of the above

8. Based on the presentation, which of the following is most likely to be true?

A) When green sickelberry juice is mixed into red in an equal amount, the striped fabric produced from the dye will have stripes of equal width.

B) If 8 month old blue, 7 month old red, and 6 month old white sickelberry juices are mixed in that order, the dye which results will not produce the proper dying effect.

C) On warm days in the country described, if sickelberry dyes are to be mixed, they must be mixed under refrigerated conditions.

D) If it takes 15 days for sickelberry bushes to grow and produce the desired berries, the maximum number of crops per year is two.

E) None of the above

9. Based on the presentation, which of the following is most likely to be true?

A) Sickelberry bushes can not grow in tropical countries.

B) Countries which are heavily industrialized could grow sickelberry bushes.

C) When the growing of sickelberry bushes is family centered, it is a profitable operation.

D) The total time required to produce an acceptable sickelberry dye in the country described in the presentation will not exceed nine months.

E) None of the above

Answer Key - Colorology

Question	1	2	3	4	5	6	7	8	9
Answer	C	B	E	D	C	C	B	A	B
Point Value	1	1	1	2	2	3	3	4	4

APPENDIX B

Test Elements Used with the Sixth Grade Population

Content Page

Main Phase

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Validation Phase

Cow Bird - Programmed Instruction 179
    Audio Tape 186
    Text 189
    Test Items 192
    Answer Key 195

MEDIA TEST SEGMENT

Text Programmed Instruction

MONKEY WEED

This is the programmed instruction part of the media test. Before you read any more, see if you have a pencil and a folder marked TEST. Please do not open the folder. If you do not have these two things raise your hand now. If you do have these two things turn the page and keep reading.

This test has three parts.

First, I will tell you what kind of things will be asked on the test.

Second, you will do a programmed instruction unit.

Third, you will answer some questions about the story. These questions are in the folder.

Now turn the page.

What kind of things will be asked on the test.

After you have done the programmed instruction unit, you will be asked to remember facts which were in the unit.

You will be asked to work problems using the facts given in the programmed instruction unit.

You will be asked whether sentences are true, based on the facts presented in the programmed instruction unit.

Now with these objectives in mind, turn the page and begin the programmed instruction unit.

F1. In the country of Tie the Monkey Weed is a common and important plant.

Q. The Monkey Weed grows in the country of ____________.

Answer: country of Tie

F2.

Monkey weed is different from other plants. It has roots which act as feet. It makes sounds like a monkey, and it eats fruit.

Q. The Monkey Weed is different because it has roots which act as ____________. It makes sounds like a ____________, and it eats ______________.

Answer: act as feet
sounds like a monkey
eats fruit

F3.

For the people of Tie, the Monkey Weed is important because it is their main source of food.

Q. The main source of food in Tie is ________ _________.

Answer: Tie is Monkey Weed

F4.

Since only 3 ounces of the Monkey Weed can be used for food, the people of Tie need many plants. In fact, 100 Monkey Weed plants are grown for each person living in Tie.

Q. _______ounces of Monkey Weed can be used as food.

_______Monkey Weed plants are grown for each person living in Tie.

F5. Answer: 3 ounces of Monkey Weed

100 Monkey Weed plants

The country of Tie has many visitors every year. Each town in Tie grows 2,000 extra Monkey Weed plants in order to be sure they will have enough for the visitors. This extra Monkey Weed is canned or frozen.

Q. Each town in Tie grows_______extra Monkey Weed plants for the_________visitors who come each year. The extra Monkey Weed is_________or_________.

F6. Answer: grows 2,000 extra

for the many visitors

is canned or frozen

Usually about 70 percent of this extra Monkey Weed is used by the visitors and the rest is sold to other countries.

Q. ___________percent of the extra Monkey Weed is used by visitors. The rest is sold to __________ ___________.

F7. Answer: 70 percent

sold to other countries

It is easy to grow Monkey Weed. Monkey Weed seeds are started in trays of soft warm dirt. Each tray will hold 50 plants. These trays are kept in the Tie homes for 3 weeks.

Q. Monkey Weed seeds are started in __________ of soft warm dirt which will hold _______ plants. The trays are kept in the Tie homes for ________ weeks.

F8. Answer: started in trays
hold 50 plants
for 3 weeks

At this time the Monkey Weed plants are big enough to be kept outside in fences fields. These fields are one mile square.

Q. When the Monkey Weed plants are three weeks old they are put in ________ mile square fields.

F9. Answer: put in one mile

Since Monkey Weed plants can move on their foot-like roots, keeping them inside the fences area can be a problem. The fences must be at least six feet high.

Q. Monkey Weed plants can ________ on their foot-like roots. So, to keep the plants in the fenced fields, the fences must be at least _________ feet.

F10.

Answer: plants can move on
must be at least six feet

Outside the fence there must be a row of stones two feet wide. Also, there can be no other plants of any kind within 25 feet of the fence.

Q. A row of stones______feet wide is placed around the fence. Also, no other plants can be kept within ______feet of the fence.

F11.

Answer: stones two feet wide
within 25 feet of

After Monkey Weed plants have grown for 7 months they can move only 2 or 3 feet. This is a sign that they are ready to be used for food.

Q. When Monkey Weed plants are______months old they can move only_____or_____feet. This is a sign that they are ready to be used for_________.

F12.

Answer: are 7 months old
only 2 or 3 feet
used for food

160

Even though we don't need Monkey Weed plants for food, I think it would be fun to grow some. If you ever get any Monkey Weed seeds, be sure to share them with us.

Close this booklet and sit quietly until you are told to start the test.

TEST ITEMS

Each of the following test items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully. Then choose the best answer. Only one answer is correct for each item. Find the letter in front of the answer you chose. Write that letter in the circle on the side of the page. Answer each question, one at a time. Do not turn back to any question you have read or answered.

1. The story you just read was about ____________.
   - A) Monkey Grass
   - B) Weed Stone
   - C) Monkey Weed
   - D) Walking Weed
   - E) None of the above
2. The story took place in the country of ____________.
   - A) Sky
   - B) Tie
   - C) Lie
   - D) High
   - E) None of the above

3. The story was about something which gave the people ___________.

   A) water

   B) flour

   C) heat

   D) bread

   E) none of the above

4. If the story were true, which of these sentences might not be true?

   A) 100 Monkey Weed plants are grown for each person in the country of Tie.

   B) When Monkey Weed is 3 weeks old it can move only 2 or 3 feet.

   C) 2,000 extra Monkey Weeds are grown by each town in Tie.

   D) Monkey Weed seeds are always started in the house.

   E) None of the above

5. Which of these sentences is best in telling what the Monkey Weed is like?

   A) Monkey Weed plants are tall and green.

   B) Monkey Weed plants have long tails.

   C) Monkey Weed plants can move by using their roots as feet.

   D) Monkey Weed plants are very tall and make loud noises.

E) None of the above

6. If you needed 6 ounces of Monkey Weed food, you would need__________Monkey Weed plant(s).

A) 1

B) 2

C) 3

D) 6

E) none of the above

7. If you had four trays of Monkey Weed plants, how many Monkey Weed plants would you have?

A) 50

B) 100

C) 150

D) 200

E) None of the above

8. If the story were true, which of these sentences might be true?

A) Not many people have ever visited Tie.

B) Monkey Weed can be grown in small gardens.

C) Monkey Weeds can move over stones easily.

D) Monkey Weeds can not be grown near any other plants.

D) None of the above

9. If the story were true, which of these sentences might not be true?

A) Monkey Weed plants can not move as far when they get older.

B) Monkey Weed is the only food that the people of Tie eat.

C) It would be useful to have fruit trees if you were going to grow Monkey Weed plants.

D) Monkey Weed plants can get out of low fences.

D) None of the above

Answer Key - Monkey Weed

Question	1	2	3	4	5	6	7	8	9
Answer	C	B	E	B	C	B	D	D	B
Point Value	1	1	1	2	2	3	3	4	4

MEDIA TEST SEGMENT

Audio Tape Presentation

SCRIPT

This is the audio tape part of the media test. Before I go any farther, see if you have a pencil and a folder marked test. Please do not open the folder. If you do not have these two things raise your hand now. (Pause 5 seconds)

This part of the media test has three steps.

First, you will be told what kind of things will be asked on the test.

Second, you will listen to the story.

Third, you will answer some questions about the story. These questions are in the test folder.

Now let's find out what kinds of things will be asked on the test.

After you have listened to the story you will be asked to remember facts which you heard.

You will be asked to work problems using the facts given in the story.

You will be asked whether sentences are true, based on the facts given in the story.

Now with these objectives in mind, you may listen to the story about the Waterstone.

Waterstone is an unusual and important type of stone found in the country of Fame. It is like both water and stone. It is hard and looks like stone, but if it is shaken the right way, the inside will turn to water.

Waterstone is important to the people of Fame. They do not have any lakes or rivers from which to get water. Because each person living in Fame uses one gallon of water each day the people of Fame spend a large part of their time collecting Waterstone. To get one gallon of water from Waterstone the people must collect 15 pounds of the stone.

If the people want extra water for washing clothes, growing gardens, and other such things they must collect about 150 pounds of Waterstone each day. Most of the people do collect the extra stone, since 80 per cent of the Fame people farm for a living.

It is very hard to get the water out of Waterstones. First, they must be stored in a warm room. Because the people of Fame like their houses very cool, special rooms are built for storing Waterstone. These rooms will hold about 1,000 pounds of stone at one time. New stones are put into the room every day at 10 o'clock in the morning. Stones which are ready to come out are taken from the room at 9 o'clock at night.

There is still much work to be done after the stones have been warmed. They must be shaken up and down 20 times. Since the people of Fame are very small, it is hard for them to lift the heavy stones and they can do this for only half an hour at a time. This way they spend 5 hours every day shaking the Waterstones.

45 minutes after the stones are shaken, a crack one or two inches long will open and the water will run out.

I have seen some stones in my own back yard which I thought might have been Waterstones, but they say that those special stones are found only in the land of Fame.

Open your folder now and write your name in the space provided on the front of the test booklet. (Pause 10 seconds)

In a moment you will be asked to turn the page and begin the test. You will be given seven minutes to finish your work. Be sure to read the directions carefully before you start. Now, turn the page and begin. (Silence for seven minutes)

Stop! Close your test booklet and give it to your teacher.

TEST ITEMS

Each of the following test items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully. Then choose the best answer. Only one answer is correct for each item. Find the letter in front of the answer you chose. Write that letter in the circle on the side of the page. Answer each question, one at a time. Do not turn back to any question you have read or answered.

1. The story you just heard was about ______________.
    - A) Wetrock
    - B) Icewater
    - C) Waterstone
    - D) Heavy Stone
    - E) None of the above
2. The story took place in the country of ___________.
    - A) Same
    - B) Lame
    - C) Tame
    - D) Fame
    - E) None of the above
3. The story was about something which gave the people ___________.

A) flour

B) food

C) water

D) heat

E) none of the above

4. If the story were true, which sentence do you think might not be true?

A) The people must shake the stones 20 times to get water.

B) 50 per cent of the people live on farms.

C) 15 pounds of stone is needed to get one gallon of water.

D) The people spend 5 hours shaking the stones everyday.

E) None of the above

5. Which of these sentences is best in telling what the people of Fame were like?

A) The people were mostly farmers.

B) The people were big and strong.

C) Most of the people lived in cities.

D) The people were very friendly.

E) None of the above

6. If a person in the story wanted to get 20 gallons of water, he would have to collect____________.

A) 20 pounds of stones

B) 100 pounds of stones

C) 150 pounds of stones

D) 300 pounds of stones

E) none of the above

7. If there were three people in a family, the family would have to collect __________ pounds of stones everyday.

A) 15

B) 20

C) 35

D) 50

E) none of the above

8. If the story were true, which of these sentences might be true?

A) Most of the people in the story collect 15 gallons of water everyday.

B) Most of the people in the story must work longer than 8 hours everyday.

C) As the stones are shaken they crack and the water runs out.

D) The stones must be collected before 10 o'clock.

E) None of the above

9. If the story were true, which of these sentences might not be true?

A) Most of the people in the story work in both the morning and the night.

B) The people in the story do not like to work in the rooms where the stones are stored.

C) The room where the stones are stored is big enough to hold the stones which three or more people might collect each day.

D) The stones that are collected will not crack until after they have been heated.

E) None of the above

Answer Key - Waterstone

Questions	1	2	3	4	5	6	7	8	9
Answer	C	D	C	B	A	D	E	E	E
Point Value	1	1	1	2	2	3	3	4	4

MEDIA TEST SEGMENT

Text Presentation

TEXT

This is the reading part of the media test. Before you read any more, see if you have a pencil and a folder marked TEST. Please do not open the folder. If you do not have these two things raise your hand now. If you do have these two things, keep reading.

First, you will be told what kind of things will be asked on the test.

Second, you will read the story.

Third, you will answer some questions about the story. These questions are in the test folder.

Now turn the page.

What kind of things will be asked on the test.

After you have read the story you will be asked to remember facts which you read about.

You will be asked to work problems using the facts given in the story.

You will be asked whether sentences are true, based on the facts presented in the story.

Now with these objectives in mind, turn the page and read the story.

THE GOLD BUG

There is a special kind of bug which lives in the country of King. This bug is called the Gold Bug. The Gold Bug is easy to find because of its shiny gold shell. It makes a sound like a tiny bell. It also makes gold colored powder.

This gold powder is very important. It is used in place of flour, since the people of King have no grains from which to make flour. 3 cups of gold powder is collected from a Gold Bug nest every week. Each nest has about 400 Gold Bugs in it.

The women collect the fold powder and make gold powder dough from it. They can make 20 pounds of dough from the powder they collect each day. The dough can be made into many things like gold pancakes, gold noodles, and gold crackers. In fact, so many things can be made from the dough that 60 per cent of the food used by each family of King is made from gold powder dough.

The Gold Bug is wild. He builds his nest in the woods and covers the floor of his nest with the gold powder. To get the powder, the women in each family work 3 hours every day gathering it. They must collect the powder before 2 o'clock each afternoon or it will spoil.

It is hard to get this powder since the nests are too hot to touch. The women must wear special gloves and must empty each nest in 20 minutes. The powder has heated the nest to 150 degrees. Since the Gold Bug will not live in a hot place, the women must cool the nest with water until it is less than 40 degrees. Five hours after the nest has been cooled the Gold Bug will return.

When Gold Bugs become two years old they stop making the gold powder and leave the nest. They fly to the mountains 8 or 9 miles away and rest there.

The next time you are in an airplane look carefully at all the mountains. The shiny ones you see may be the mountains of King.

Now that you have finished reading the story please close this booklet, turn it face down, and sit quietly until you are told to open the test folder.

TEST ITEMS

Each of the following items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully. Then choose the best answer. Only one answer is correct for each item. Find the letter in front of the answer you chose. Write that letter in the circle on the side of the page. Answer each question, one at a time. Do not turn back to any question you have read or answered.

1. The story you just read was about the ____________.
   A) Gold Bug
   B) Hot Bug
   C) Gold Fly
   D) Note Bug
   E) None of the above
2. The story took place in the country of ____________.
   A) Sing
   B) Ring
   C) King
   D) Bing
   E) None of the above
3. The story was about something which gave the people ______________.

A) water

B) grain

C) heat

D) rock

E) none of the above

4. If the story were true, which of these sentences do you think might not be true?

A) Only women collect the special powder.

B) Gloves must be worn when the powder is collected.

C) The Gold Bug will return to his nest as soon as the powder is collected.

D) The special powder is used instead of flour.

E) All of the above are true

5. Which of these sentences is best in telling what the Gold Bug is like?

A) The Gold Bug has a hard shell and makes a ringing sound.

B) The Gold Bug makes a sound like a bell and has a shiny shell.

C) The Gold Bug has a black shell and makes a sound like a bell.

D) The Gold Bug has a shiny shell and has eight feet.

E) None of the above

6. If you collect the powder from 2 Gold Bug nests, you would have about _____ cups of powder.

A) 3

B) 4

C) 5

D) 6

E) none of the above

7. If a woman in the story was going to work for 3 hours collecting the powder, the latest she could start her work would be ___________.

A) 9 o'clock in the morning

B) 10 o'clock in the morning

C) 11 o'clock in the morning

D) 12 o'clock in the morning

E) none of the above

8. If the story were true, which of the sentences might be true?

A) The Gold Bug can only fly short distances, one or two miles.

B) Gold Bugs like their nests to be very hot.

C) The people of King would not have bread to eat if it were not for the Gold Bug.

D) The people of King live in the woods.

E) None of the above

9. If the story were true, which of these sentences might not be true?

A) Gold Bugs live in large groups.

B) Water is needed when collecting the special powder.

C) Many of the women work late into the evening collecting the powder.

D) Each family in King uses a lot of the special powder each day.

E) None of the above

Answer Key - Gold Bug

Question	1	2	3	4	5	6	7	8	9
Answer	A	C	E	C	B	D	C	C	C
Point Value	1	1	1	2	2	3	3	4	4

3

MEDIA TEST SEGMENT

Text Programmed Instruction

THE COW BIRD

This is the programmed instruction part of the media test. Before you read any more, see if you have a pencil and a folder marked TEST. Please do not open the folder. If you do not have these two things raise your hand now. If you do have these two things turn the page and keep reading.

This test has three parts.

First, I will tell you what kind of things will be asked on the test.

Second, you will do a programmed instruction unit.

Third, you will answer some questions about the story. These questions are in the folder.

Now turn the page.

What kind of things will be asked on the test.

After you have done the programmed instruction unit, you will be asked to remember facts which were in the unit.

You will be asked to work problems using the facts given in the programmed instruction unit.

You will be asked whether sentences are true, based on the facts presented in the programmed instruction unit.

Now with these objectives in mind, turn the page and begin the programmed instruction unit.

F1. In the country of Lap lives the unusual Cow Bird.

Q. The Cow Bird lives in the country of______________.

F2. Answer: country of Lap

This bird is different because it is like a cow in many ways. It has horns like a cow. It makes a mooing sound like a cow, and it gives milk like a cow.

Q. The Cow Bird is like a _________. It makes a________ sound, gives_________, and has __________like a cow.

F3. Answer: like a cow
makes a mooing sound,
gives milk, and has horns

The Cow Bird is very important to the people of Lap. They do not have cows as we do, so they get their milk from the Cow Bird. Since each Cow Bird gives only one ounce of milk every day, the people of Lap must keep large numbers of these birds.

Q. The people of Lap get their milk from________ ______.
Each Cow Bird gives_______ounce(s) of milk every day.

F4. Answer: from the Cow Bird
gives one ounce

Every Lap family has a flock of Cow Birds. Each flock will have about 900 Cow Birds in it.

Q. Every Lap family has a flock of about______Cow Birds.

F5. Answer: about 900 Cow Birds

Most Lap families need the milk from only 500 Cow Birds, so they have some extra milk. This extra milk is made into Cow Bird cheese and Cow Bird ice cream. These are both very good to eat.

Q. Most Lap families need the milk from only______Cow Birds. Extra milk is made into Cow Bird_____________ and _____ ___________.

F6. Answer: from only 500 Cow Birds

Cow Bird cheese and ice cream

These products are sold to other people. 90 per cent of all the Lap people make a living by selling Cow Bird milk, cheese, and ice cream.

Q. _____per cent of all the Lap people make a living by selling Cow Bird milk, cheese, and ice cream.

F7. Answer: 90 per cent of all

It is very hard to raise Cow Birds. They must be kept warm and dry in the long cold winter. Since it rains almost every day in a Lap winter, special Cow

Bird houses must be built. Each house will hold about 25 birds.

Q. Cow Bird ___________ are used to keep Cow Birds warm and dry during the long cold winter. Each house will hold about ________ birds.

F8. Answer: Cow Bird houses are

hold about 25 birds

To keep the Cow Birds well they must be fed every four hours. More wood must be put into the heater every six hours. To keep the Cow Bird fed and warm is hard work.

Q. Cow Birds must be fed every ______ hours. Wood is put into the heaters every _______ hours.

F9. Answer: fed every four hours

heater every six hours

Cow Birds are also hard to care for in the summer time. They get sick if it becomes warmer than 80 degrees. Most Lap summer days are hot.

Q. Cow Birds get sick if it becomes warmer than _____ degrees. Most summer days are ________.

F10. Answer: warmer than 80 degrees

summer days are hot

To keep the temperature low, ice is placed in the Cow Bird houses twice a day. This is done at 6 o'clock in the morning and at 2 o'clock in the afternoon.

Q. Twice a day_______is placed in the Cow Bird houses to keep them cool. This is done at______o'clock in the morning and at ______o'clock in the afternoon.

F11. Answer: Twice a day ice is placed
done at 6 o'clock in
and at 2 o'clock in the

When the Lap children are twelve years old they are given three or four houses of Cow Birds for their very own. This is a sign that the child has become an adult.

Q. Lap children are given_____or_____houses of Cow Birds when they are________years old. This is a sign that they have become an________.

F12. Answer: given three or four
are twelve years old
have become an adult

Even though Cow Birds are hard to raise, the people of Lap love them. They are friendly birds which also provide food. If you ever get to the country of Lap you must see the Cow Bird. Maybe you can even bring one home as a pet.

Close this booklet and sit quietly until you are told to start the test.

MEDIA TEST SEGMENT

Text Presentation

TEXT

This is the reading part of the media test. Before you read any more, see if you have a pencil and a folder marked TEST. Please do not open the folder. If you do not have these two things raise your hand now. If you do have these two things, keep reading.

First, you will be told what kind of things will be asked on the test.

Second, you will read the story.

Third, you will answer some questions about the story. These questions are in the test folder.

Now turn the page.

What kind of things will be asked on the test.

After you have read the story you will be asked to remember facts which you read about.

You will be asked to work problems using the facts given in the story.

You will be asked whether sentences are true, based on the facts presented in the story.

Now with these objectives in mind, turn the page and read the story.

THE COW BIRD

In the country of Lap lives the unusual Cow Bird. This bird is different because it is like a cow in many ways. It has horns like a cow. It makes a mooing sound like a cow, and it gives milk like a cow.

The Cow Bird is very important to the people of Lap. They do not have cows as we do so they get their milk from the Cow Bird. Since each Cow Bird gives only one ounce of milk every day, the people of Lap must keep large numbers of these birds. Every Lap family has a flock of Cow Birds. Each flock will have about 900 Cow Birds in it.

Most Lap families need the milk from only 500 Cow Birds, so they have some extra milk. This extra milk is made into Cow Bird cheese and Cow Bird ice cream. These are both very good to eat. These products are sold to other people. 90 percent of all the Lap people make a living by selling Cow Bird milk, cheese, and ice cream.

It is very hard to raise Cow Birds. They must be kept warm and dry in the long cold winter. Since it rains almost every day in a Lap winter, special Cow Birds houses must be built. Each Cow Bird house will hold about 25 birds. To keep the Cow Birds well they must be fed every four hours. More wood must be put into the heater every six hours. To keep the Cow Bird fed and warm during the winter is hard work.

Cow Birds are also hard to care for in the summer time. They get sick if it becomes warmer than 80 degrees. Most Lap summer days are hot. To keep the temperature low, ice is placed in the Cow Bird houses twice a day. This is done at 6 o'clock in the morning and at 2 o'clock in the afternoon.

When the Lap children are twelve years old they are given three or four houses of Cow Birds for thier very own. This is a sign that the child has become an adult.

Even though Cow Birds are hard to raise, the people of Lap love them. They are friendly birds which also provide food. If you ever get to the country of Lap you must see the Cow Bird. Maybe you can even bring one home as a pet.

Now that you have finished reading the story please close this booklet, turn it face down, and sit quietly until you are told to open the test folder.

MEDIA TEST SEGMENT

Audio Tape Presentation

SCRIPT

This is the audio tape part of the media test. Before I go any farther, see if you have a pencil and a folder marked test. Please do not open the folder. If you do not have these two things raise your hand now. (Pause 5 seconds)

This part of the media test has three steps.

First, you will be told what kind of things will be asked on the test.

Second, you will listen to the story.

Third, you will answer some questions about the story. These questions are in the test folder.

Now let's find out what kinds of things will be asked on the test.

After you have listened to the story you will be asked to remember facts which you hears.

You will be asked to work problems using the facts given in the story.

You will be asked whether sentences are true, based on the facts given in the story.

Now with these objectives in mind, you may listen to the story about the Cow Bird.

In the country of Lap lives the unusual Cow Bird. This bird is different because it is like a cow in many ways. It has horns like a cow. It makes a mooing sound like a cow, and it gives milk like a cow.

The Cow Bird is very important to the people of Lap. They do not have cows as we do, so they get their milk from the Cow Bird. Since each Cow Bird gives only one ounce of milk every day, the people of Lap must keep large numbers of these birds. Every Lap family has a flock of Cow Birds. Each flock will have about 900 Cow Birds in it.

Most Lap families need the milk from only 500 Cow Birds, so they have some extra milk. This extra milk is made into Cow Bird cheese and Cow Bird ice cream. These are both very good to eat. These products are sold to other people. 90 percent of all the Lap people make a living be selling Cow Bird milk, cheese, and ice cream.

It is very hard to raise Cow Birds. They must be kept warm and dry in the long cold winter. Since it rains almost every day in a Lap winter, special Cow Bird houses must be built. Each Cow Bird house will hold about 25 birds. To keep the Cow Birds well they must be fed every four hours. More wood must be put into the heater every six hours. To keep the Cow Bird fed and warm during the winter is hard work.

Cow Birds are also hard to care for in the summer time. They get sick if it becomes warmer than 80 degrees. Most Lap summer days are hot. To keep the temperature low, ice is placed in the Cow Bird houses twice a day. This is done at 6 o'clock in the morning and at 2 o'clock in the afternoon.

When the Lap children are twelve years old they are given three or four houses of Cow Birds for their very own. This is a sign that the child has become an adult.

Even though Cow Birds are hard to raise, the people of Lap love them. They are friendly birds which also provide food. If you ever get to the country of Lap you must see the Cow Bird. Maybe you can even bring one home as a pet.

Open your folder now and write your name in the space provided on the front of the test booklet. (Pause 10 seconds)

In a moment you will be asked to turn the page and begin the test. You will be given seven minutes to finish your work. Be sure to read the directions carefully before you start. Now, turn the page and begin. (Silence for seven minutes)

Stop! Close your test booklet and give it to your teacher.

TEST ITEMS

Each of the following items was presented on a separate sheet in a test booklet form.

DIRECTIONS: Read each test item carefully. Then choose the best answer. Only one answer is correct for each item. Find the letter in front of the answer you chose. Write that letter in the circle on the side of the page. Answer each question, one at a time. Do not turn back to any question you have read or answered.

1. The story you just (read/heard) was about______________.
   - A) Cow Stones
   - B) Bird Dogs
   - C) Milk Stones
   - D) Cow Dogs
   - E) None of the above
2. The story took place in the country of_____________.
   - A) Lap
   - B) Sap
   - C) Nap
   - D) Tap
   - E) None of the above
3. The story was about something which gave the people___.

A) water

B) flour

C) grain

D) milk

E) none of the above

4. If the story were true, which sentence do you think might not be true?

   A) Cow Birds get sick when they get warmer than 80 degrees.

   B) Cow Bird houses will hold about 25 Cow Birds.

   C) Most Lap families raise extra Cow Birds.

   D) Cow Birds like the long cold winter.

   E) None of the above

5. Which of these sentences is best in telling what the Cow Bird is like?

   A) When you hear the Cow Bird you may think it is a cow.

   B) The Cow Bird is very large and has four feet.

   C) The Cow Bird has soft fur instead of feathers.

   D) The Cow Bird is mean, it does not like people.

   E) None of the above.

6. If a person in the story wanted 10 ounces of milk everyday, he would need______Cow Bird(s).

   A) 1

   B) 5

C) 10

D) 20

E) None of the above

7. If you wanted to raise 100 Cow Birds you would have to built__________Cow Bird houses.

A) 1

B) 2

C) 3

D) 4

E) None of the above

8. If the story were true, which of these sentences might be true?

A) Lap is a country which has a long cool summer.

B) Most Lap families keep more than 500 Cow Birds.

C) The Cow Bird is kept outside most of the year.

D) The Cow Bird can fly for many miles without stopping.

E) None of the above.

9. If the story were true, which of these sentences might not be true?

A) Most of the people who live in Lap raise Cow Birds and sell things made from their milk.

B) The Lap people need to work only a few hours each day caring for their Cow Birds.

C) It would not be easy to raise Cow Birds in a hot dry country.

D) If there were trees in the country of Lap, it would be much harder to raise Cow Birds.

E) None of the above

Answer Key - Cow Bird

Questions	1	2	3	4	5	6	7	8	9
Answer	E	A	D	D	A	C	D	B	B
Point Value	1	1	1	2	2	3	3	4	4

ALFRED V. RAPP

Vita

PERSONAL INFORMATION

Date of Birth	November 6, 1939
Marital Status	Married Wife: Carol Ann Children: Carla Gene and Melissa
Address	General Delivery Blowing Rock, North Carolina 28605
Telephone	Area Code 704/295-7995

EDUCATIONAL BACKGROUND

Secondary	Hoban High School Akron, Ohio
Universities	Kent State University Kent, Ohio Bachelor Degree 1960 Major: Industrial Arts Masters Degree 1965 Major: Industrial Arts Minor: Education University of Northern Colorado, Greeley, Colorado Doctor of Education 1972 Major: Industrial Arts Minor: Educational Media

POSITIONS HELD

Teacher	Copley Junior and Senior High School, Copley, Ohio (1960-1965)

Teacher and Department Head	Nova Junior-Senior High School Fort Lauderdale, Florida (1965-1968)
Supervisor of Technical Science 1-12	Nova Schools Fort Lauderdale, Florida (1968-1969)
Educational Analyst	Computer Applications Incorporated, Silver Spring, Maryland (1969-1970)

PRESENT POSITION

Assistant Professor	Appalachian State University Boone, North Carolina

ARTICLES

Smith, Warren and Rapp Al. "Equipment for Materials Testing" I.A.V.E., October, 1966

Rapp, Al. "Learning Activity Package" The Journal of Industrial Arts Education, September-October, 1967.

EDUCATION RELATED EXPERIENCE

President's Commission for Policy Statement on the Relationship of Industrial Arts to other programs in education (American Industrial Arts Association)

Cited in Ohio State University Report on Innovative Programs for the State of Ohio as having developed an Innovative Program in Industrial Arts

Conducted in-service training program for Broward Industrial Arts Association and Broward County Board of Public Instruction on writing of behavioral objectives

Developed and implemented staff training materials and program for the Model Secondary School for the Deaf, under the auspices of Gallaudet College, sponsored by the Bureau of Handicapped

Project evaluation and recommendation for the Center for Occupational Education, North Carolina State, Raleigh

Development of self-instruction, audio-visual training system for basic prevocational skills. A Job Corps/Department of Labor project

Development of a classroom management and information system, information form, and instructional manual for the Model Secondary School for the Deaf

FUTURE ACTIVITIES

Continue in teaching role at Appalachian State University and participate in the Triple T Program at Appalachian State